

Atty. Docket No.: 021040-000300  
Applicant: Yan Zhou and Seng-Tiong Ho  
Title: INTEGRATED PLANAR COMPOSITE COUPLING STRUCTURES  
FOR BI-DIRECTIONAL LIGHT BEAM TRANSFORMATION...  
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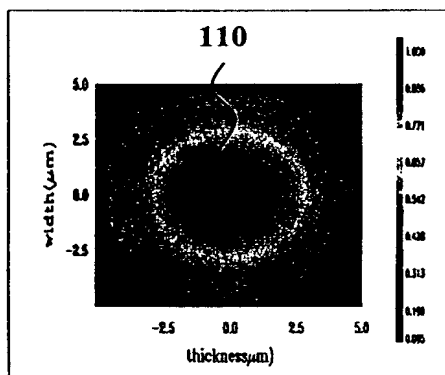


FIG 1 (a)

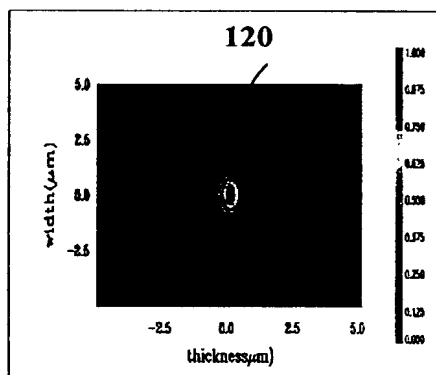
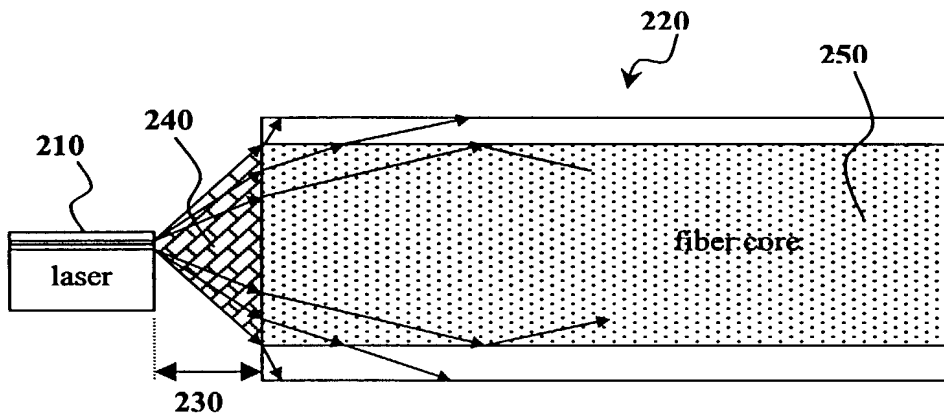


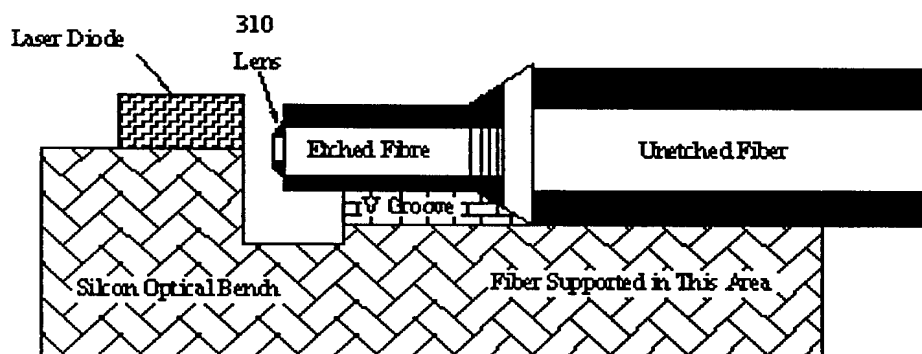
FIG 1 (b)



PRIOR ART

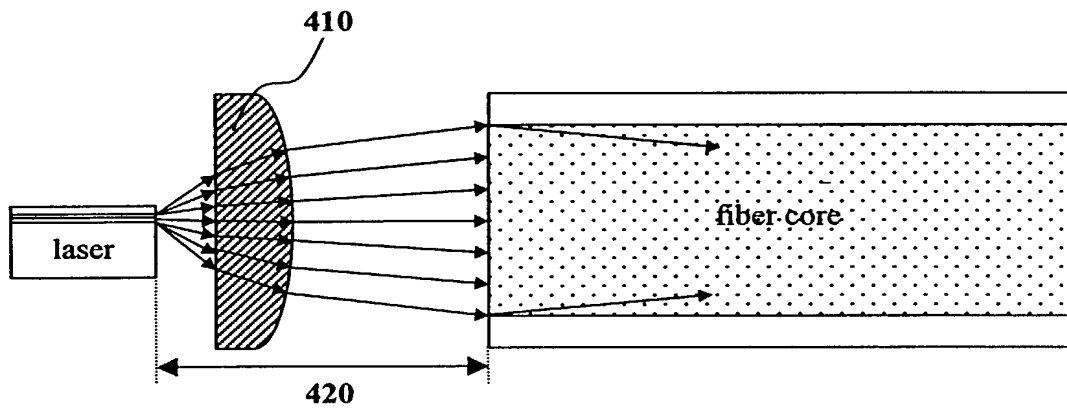
FIG 2

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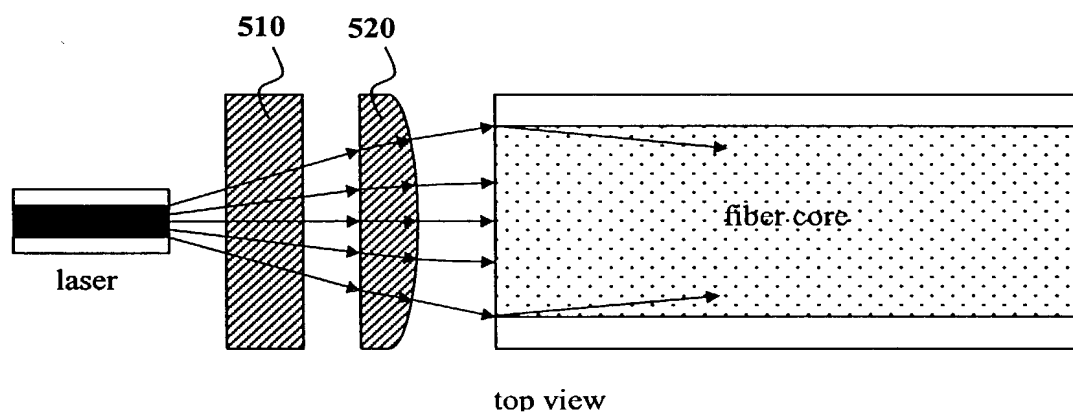
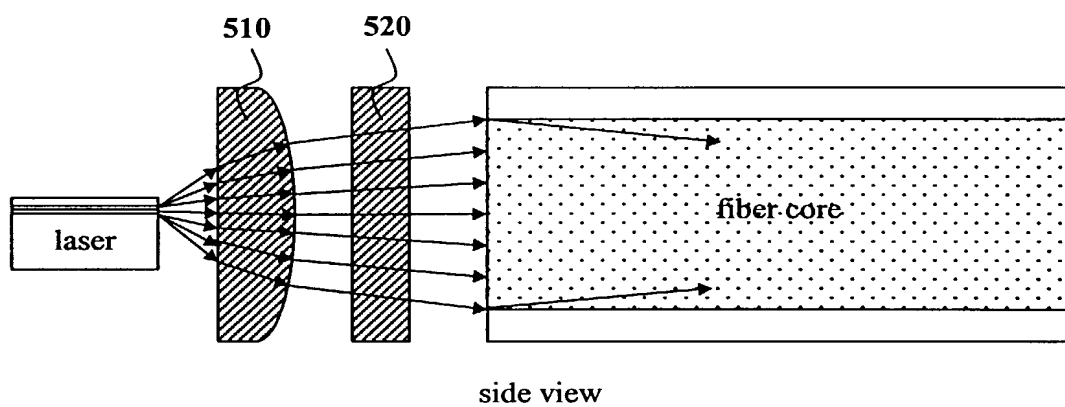
PRIOR ART

FIG. 3



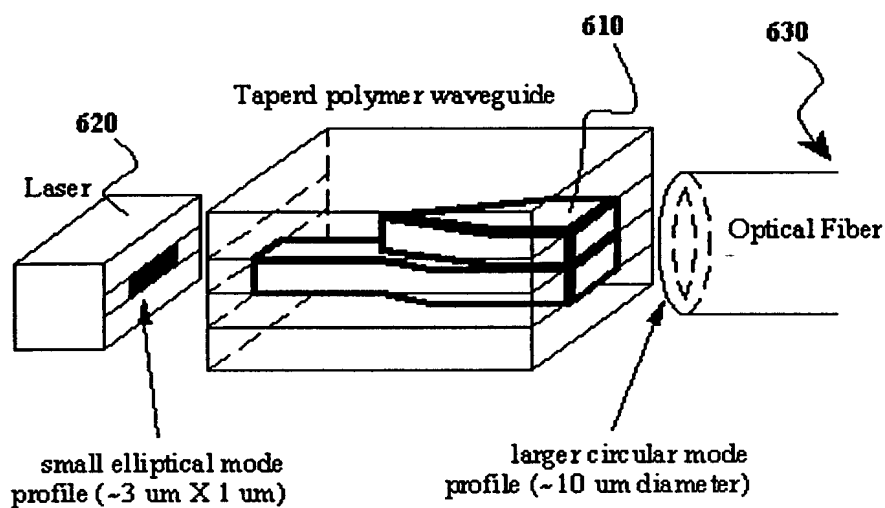
PRIOR ART

FIG. 4



PRIOR ART

FIG. 5



PRIOR ART

FIG. 6

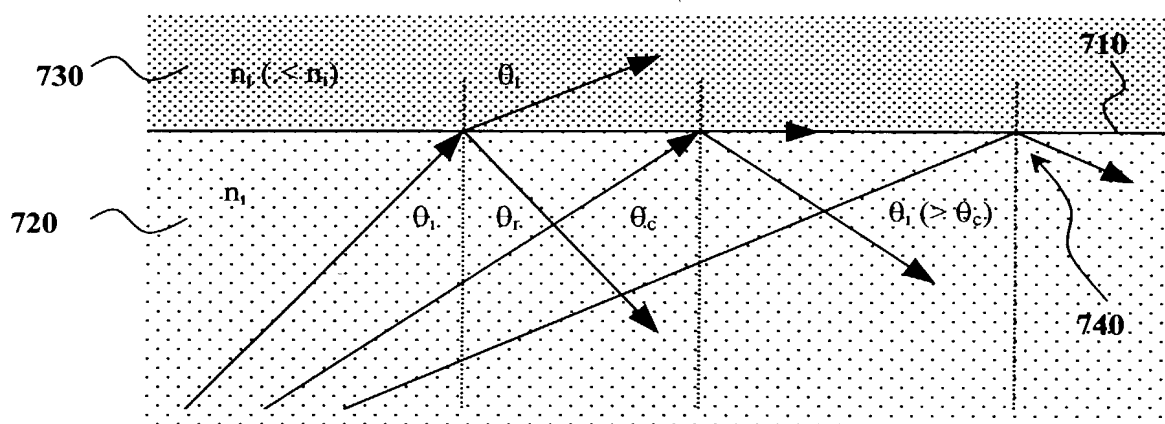


FIG 7

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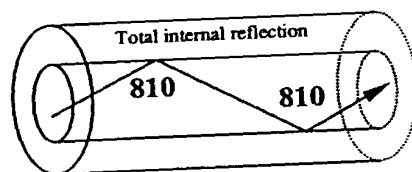


FIG 8



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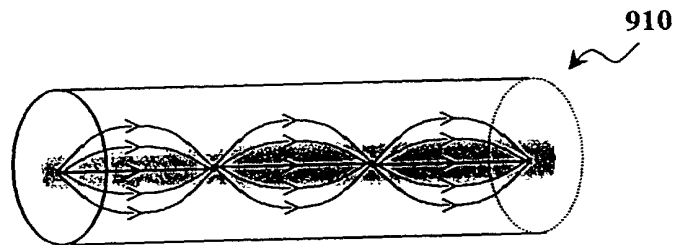


FIG 9

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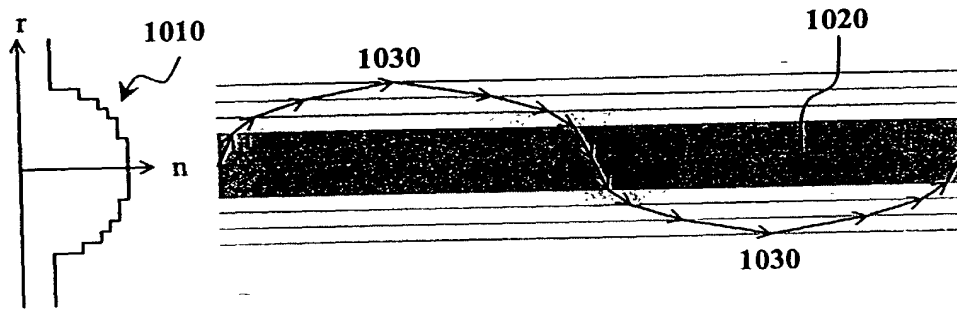


FIG 10

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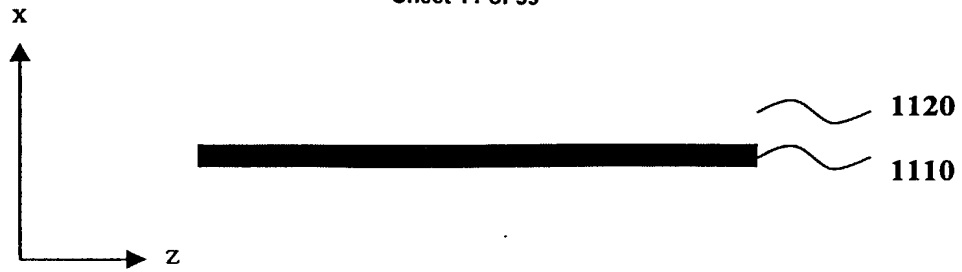


Fig 11A

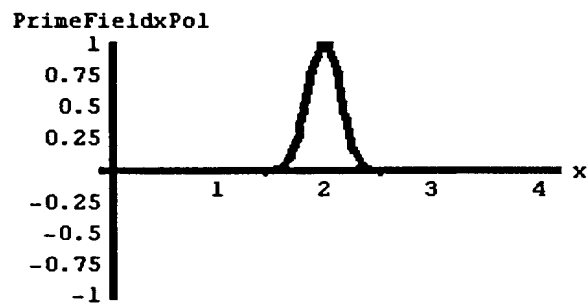


Fig 11B

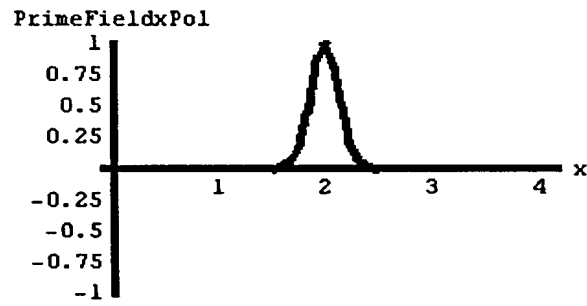


Fig 11C

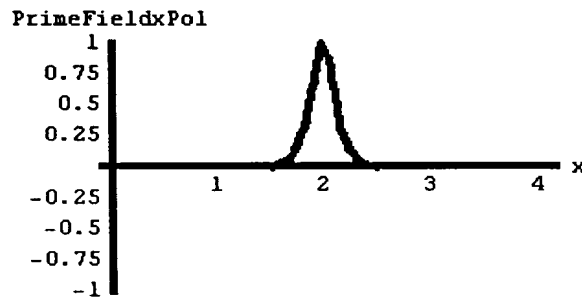


Fig 11D

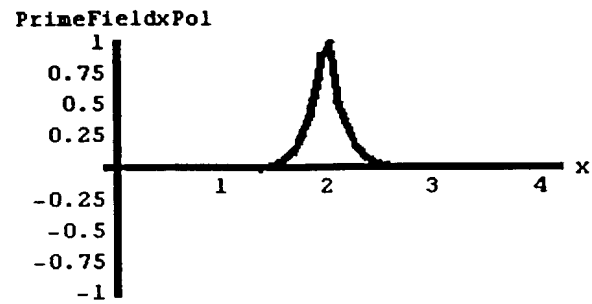


Fig 11E

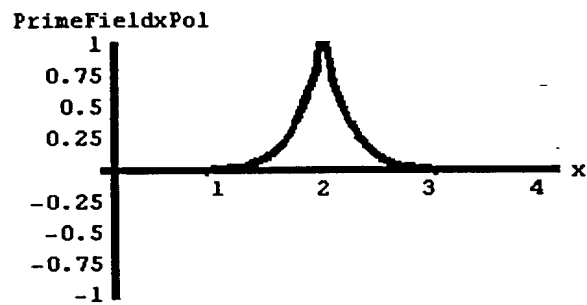


Fig 11F

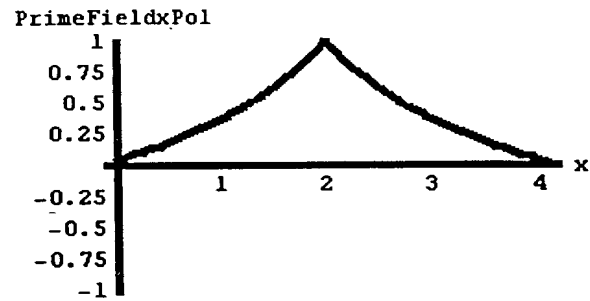
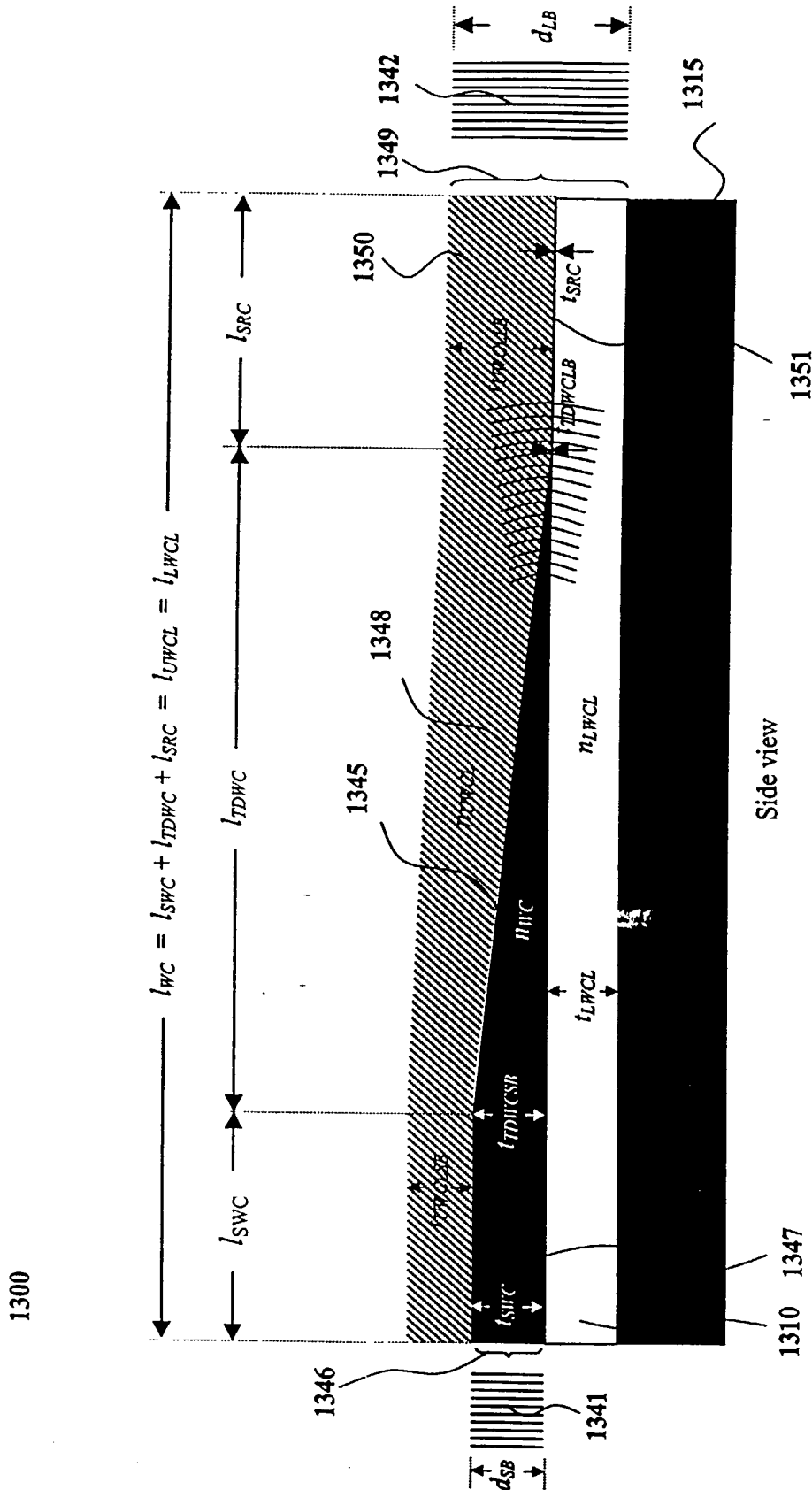


Fig 11G

FIG. 12



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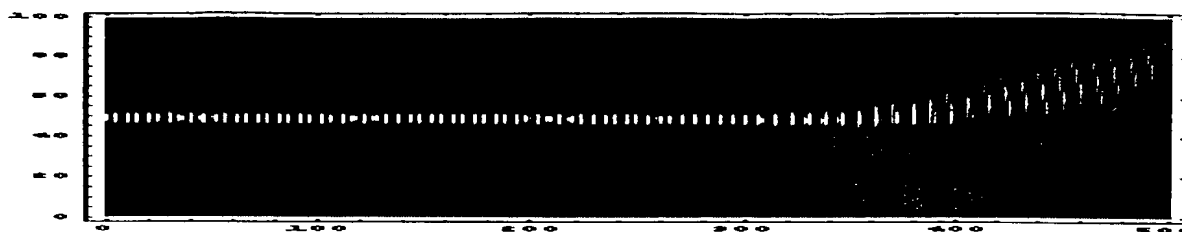
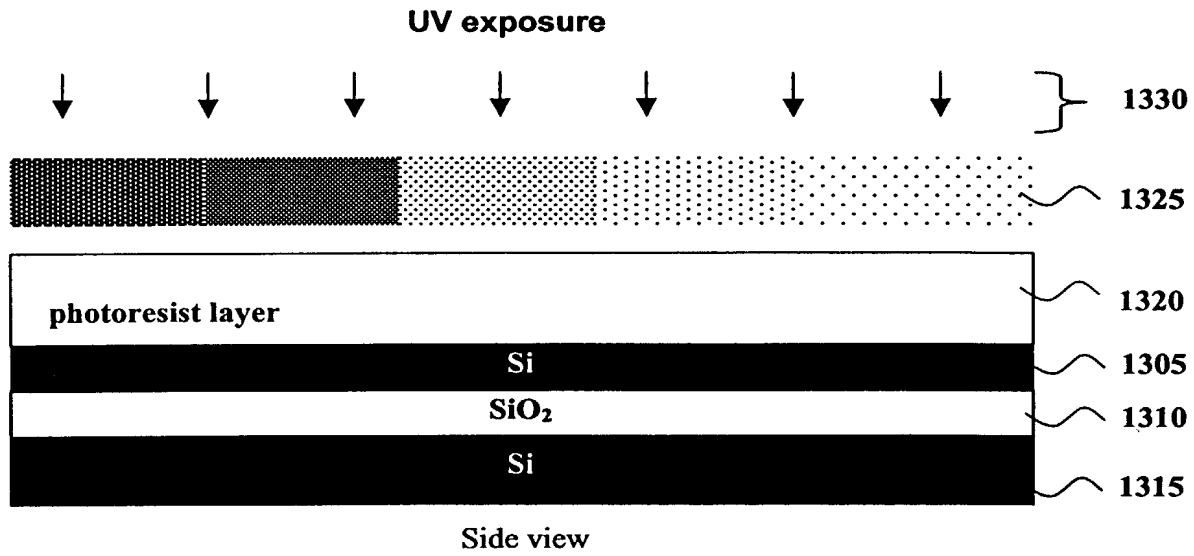
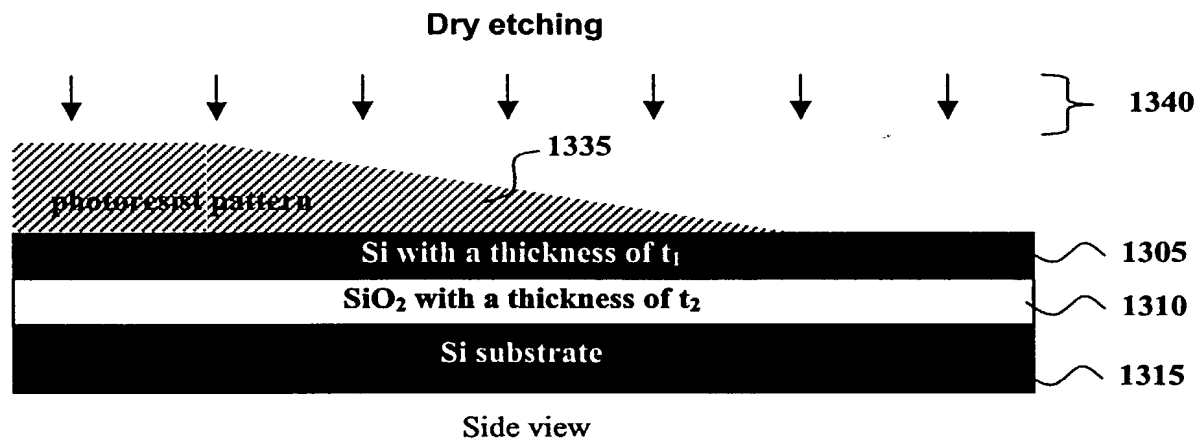


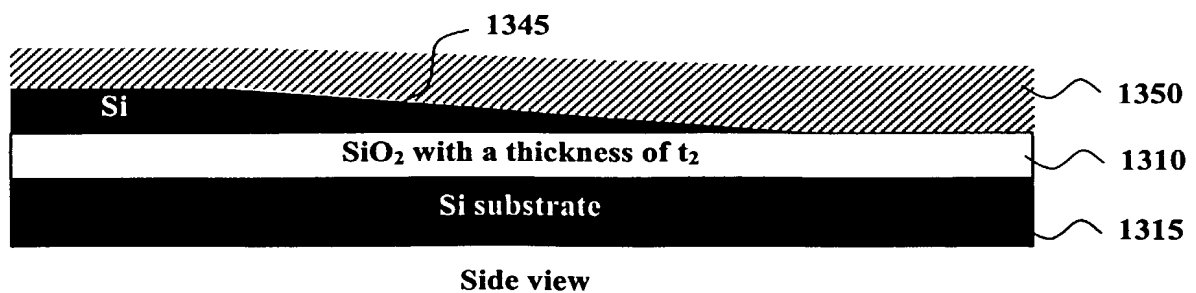
FIG 14



**Fig 15A**



**Fig 15B**



**Fig 15C**





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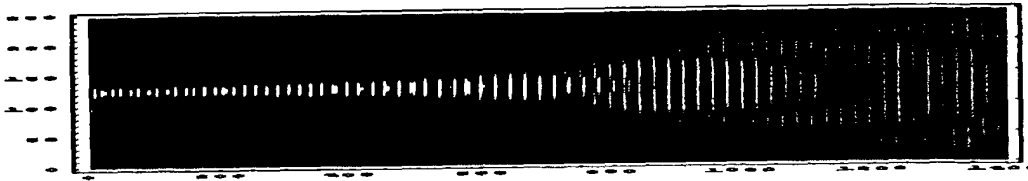
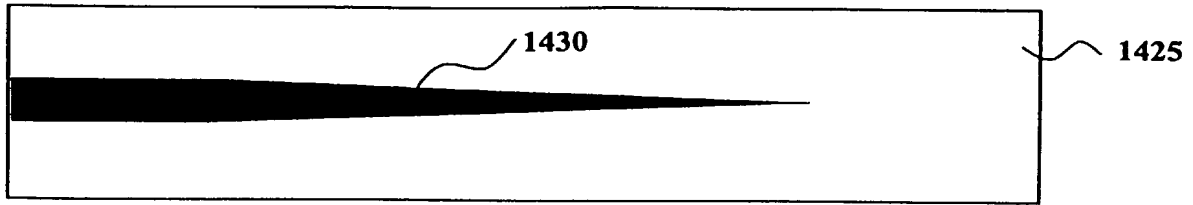


FIG 17

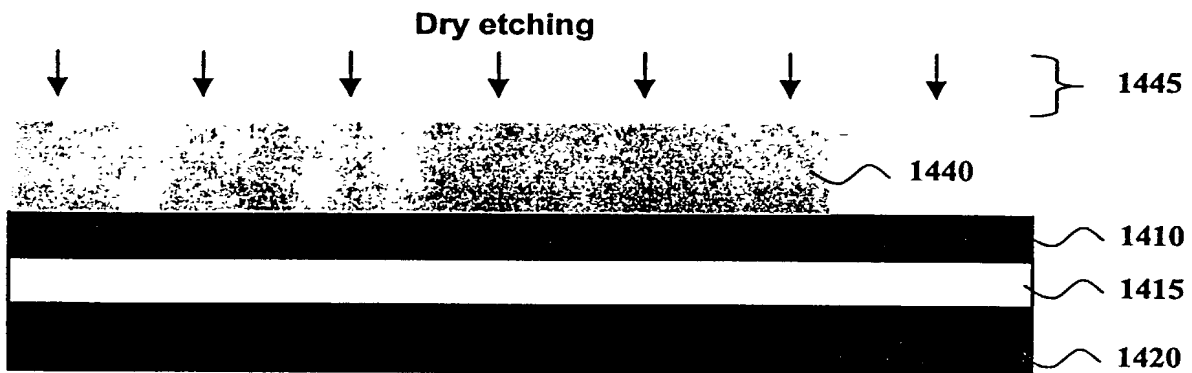


FIG. 19



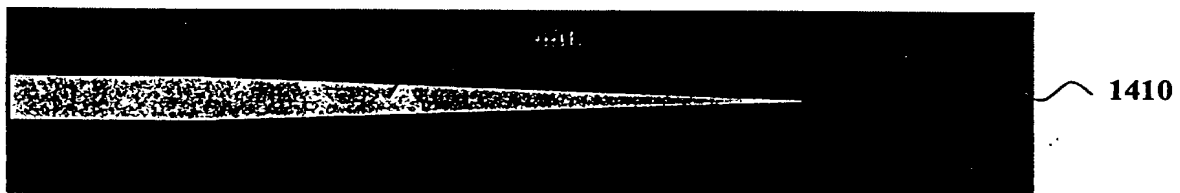
Mask top view

Fig 18A



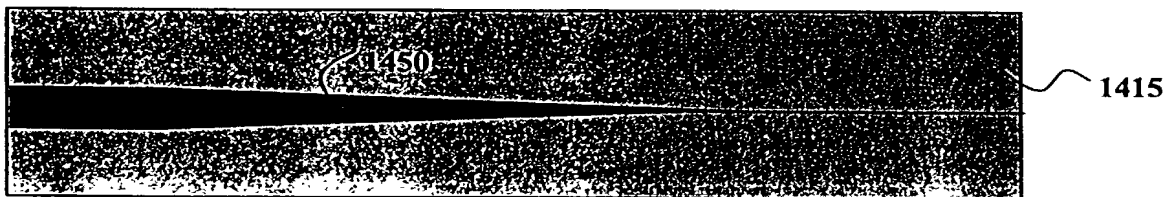
Side view

Fig 18B



Photoresist pattern top view

Fig 18C



Si tapered down/narrow section top view

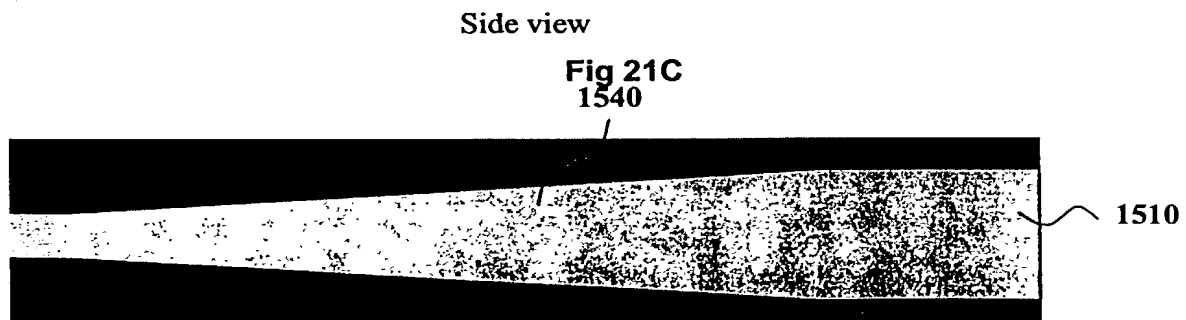
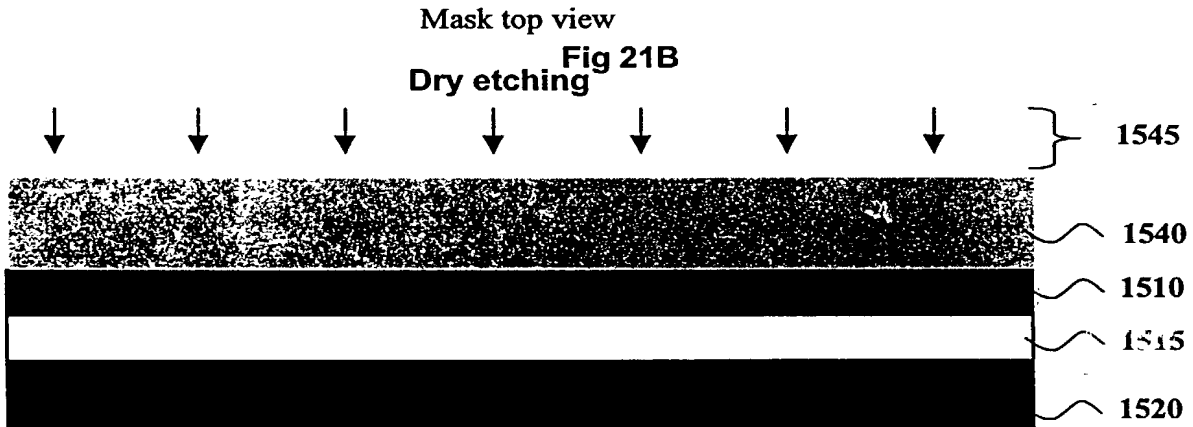
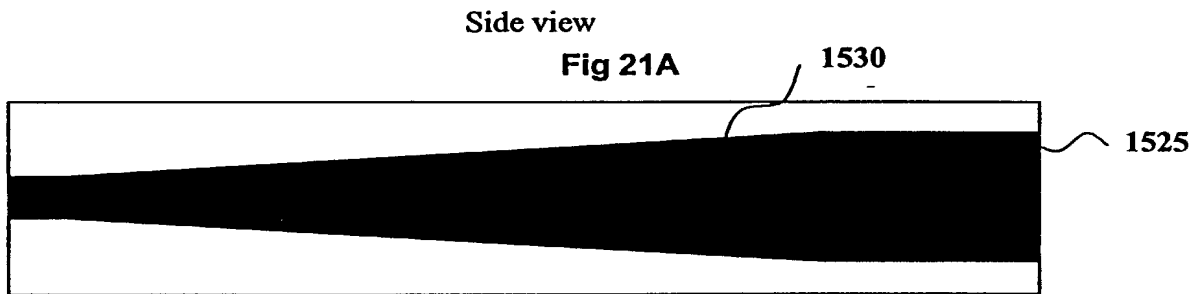
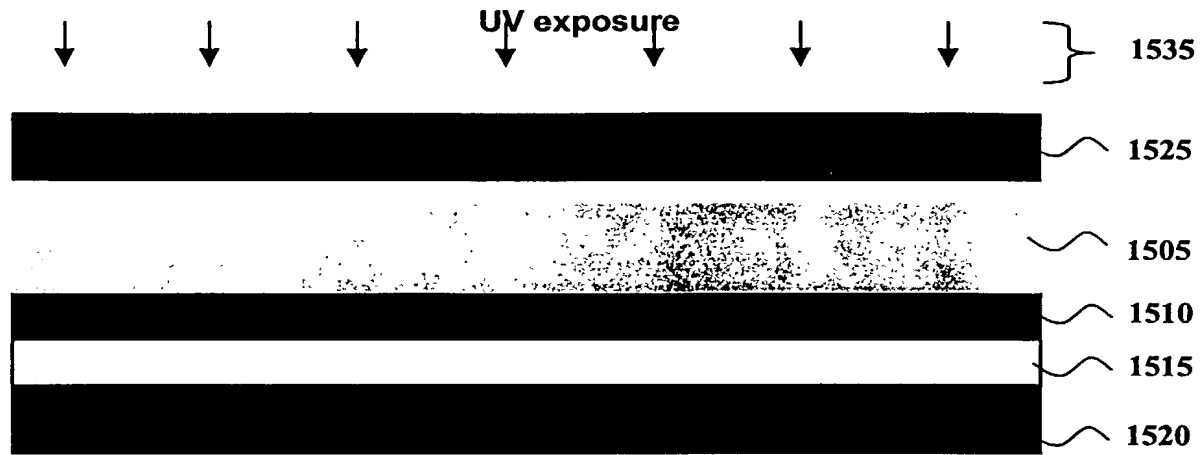
Fig 18D

10063674.052403

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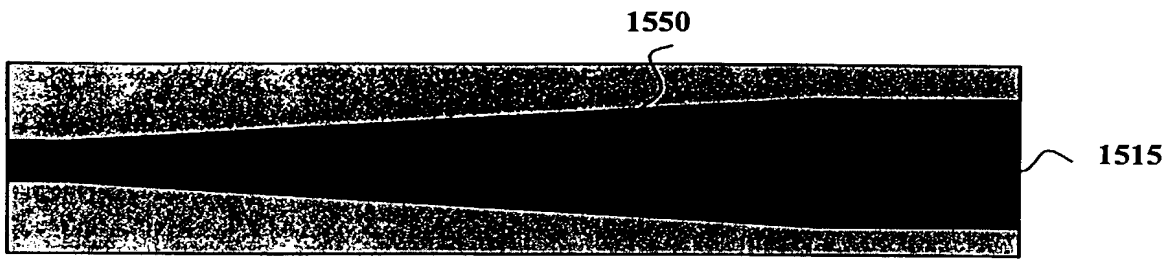


**Fig. 20**



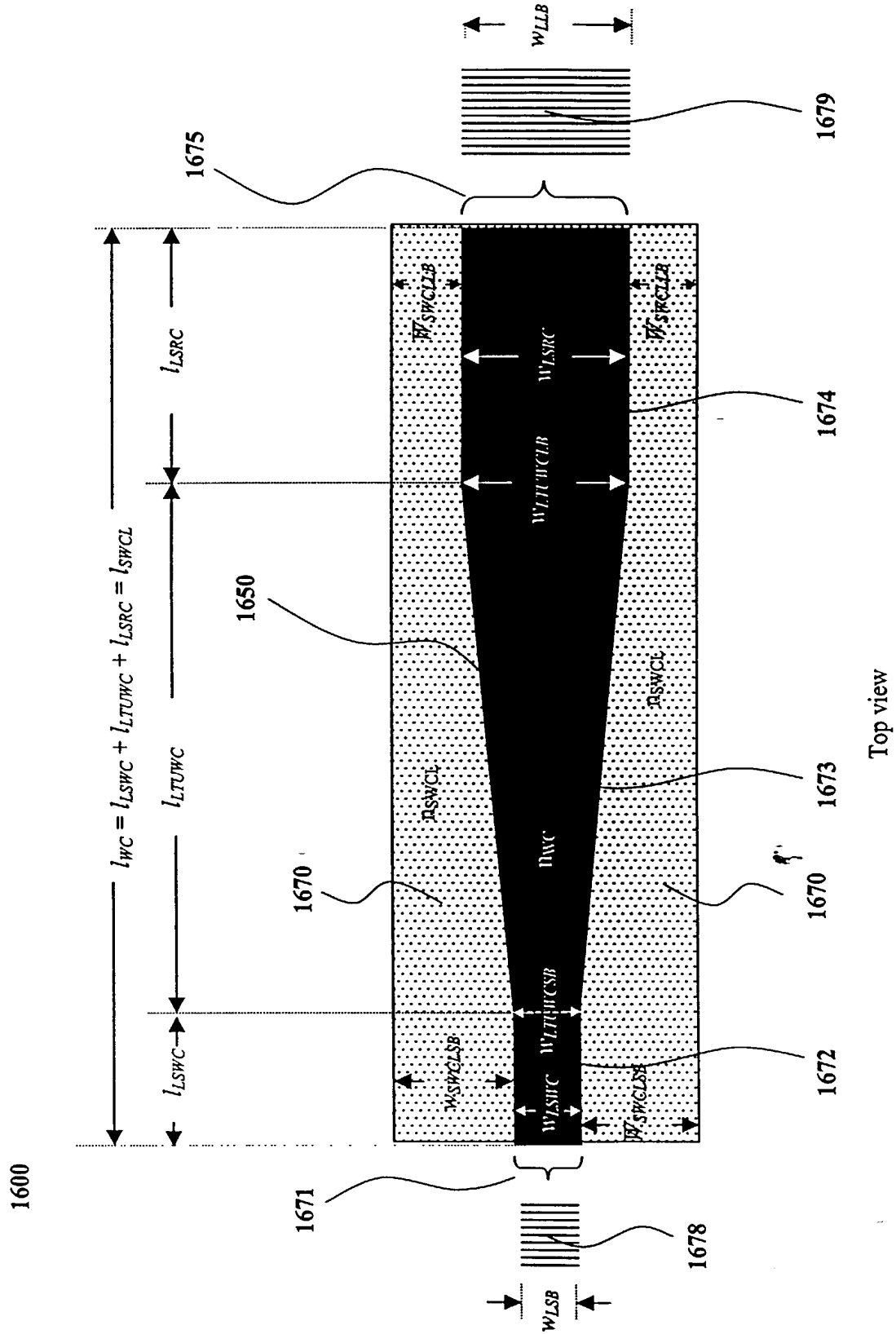
Photoresist pattern top view Fig 21D

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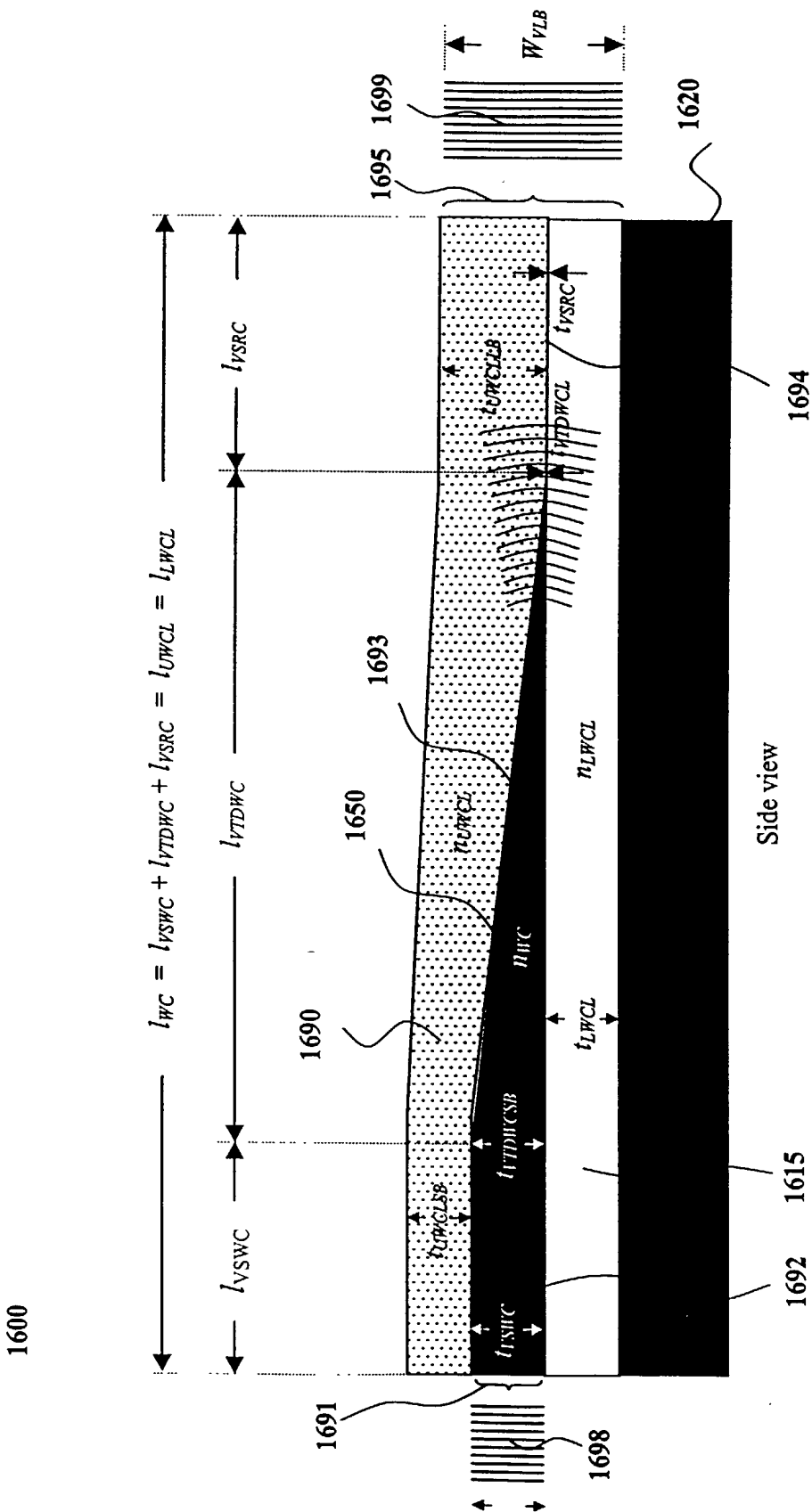


Si tapered up/wide section top view

FIG. 21E







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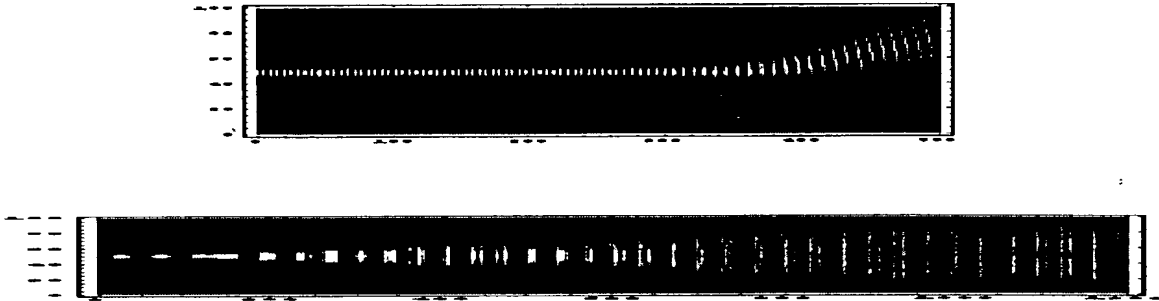
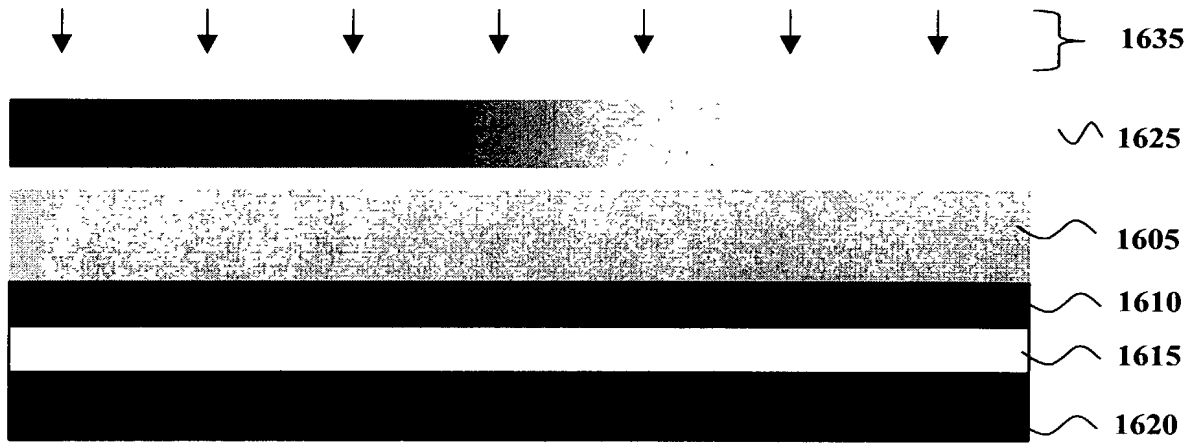
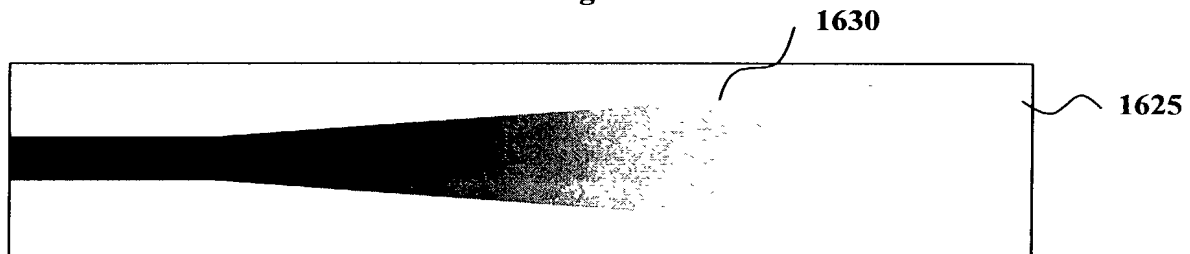


FIG 23

**UV exposure**

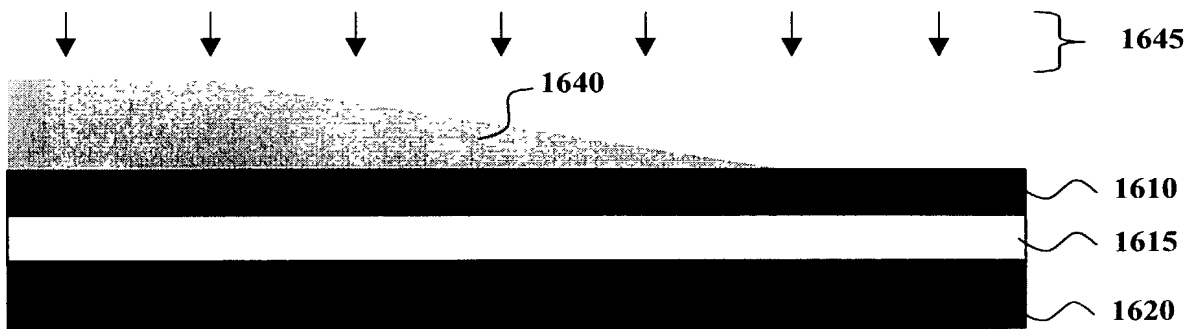


Side view-Fig 24A

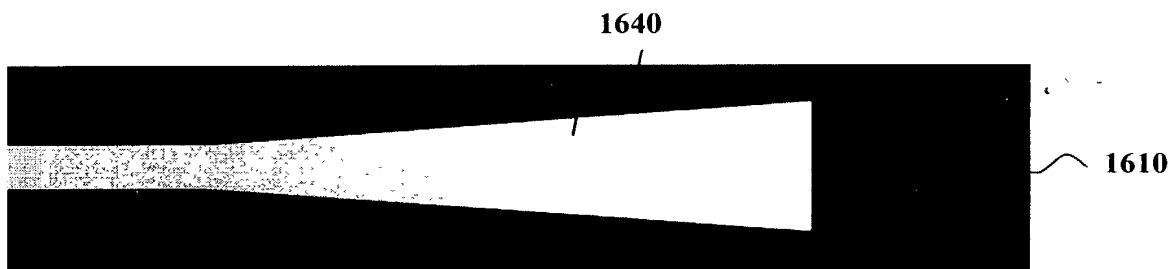


Mask top view-Fig 24B

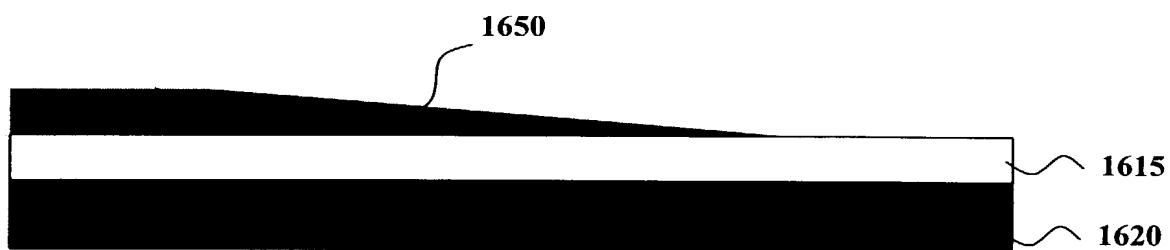
**Dry etching**



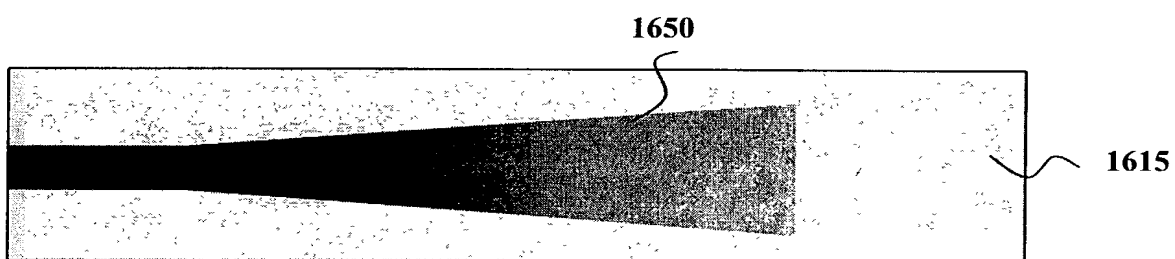
Side view-FIG 24C



Photoresist pattern top view-FIG24D

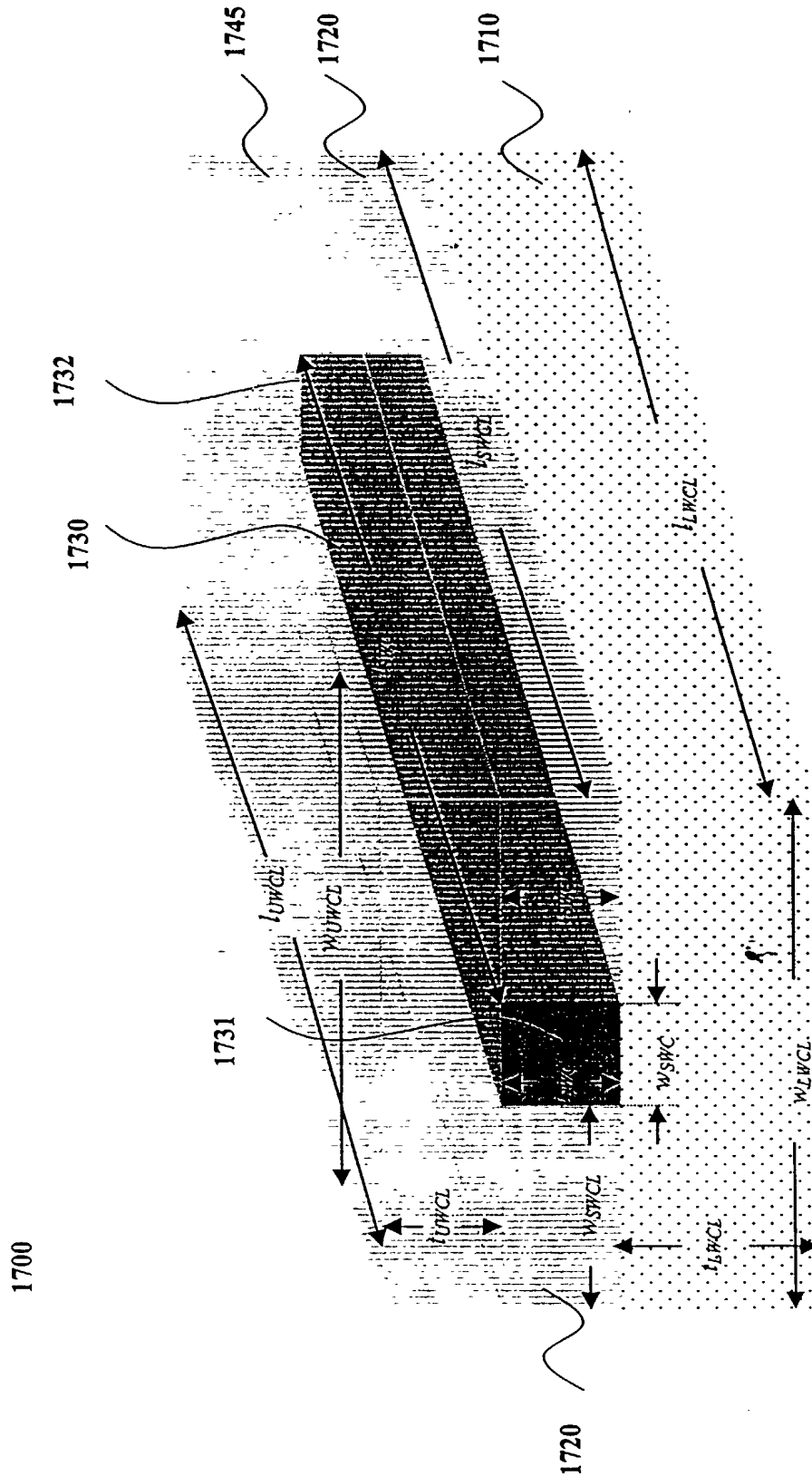


Side view-FIG24E

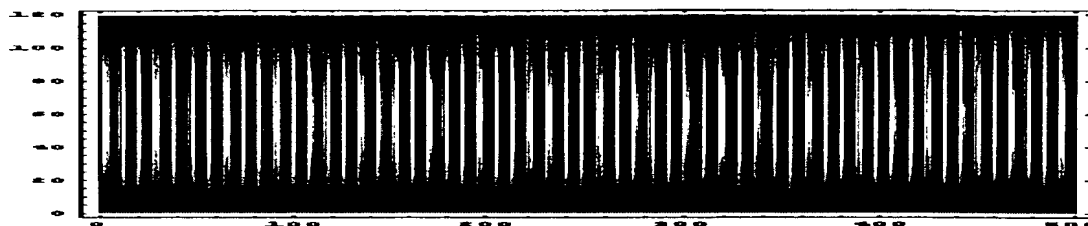


Si tapered up/wide section top view

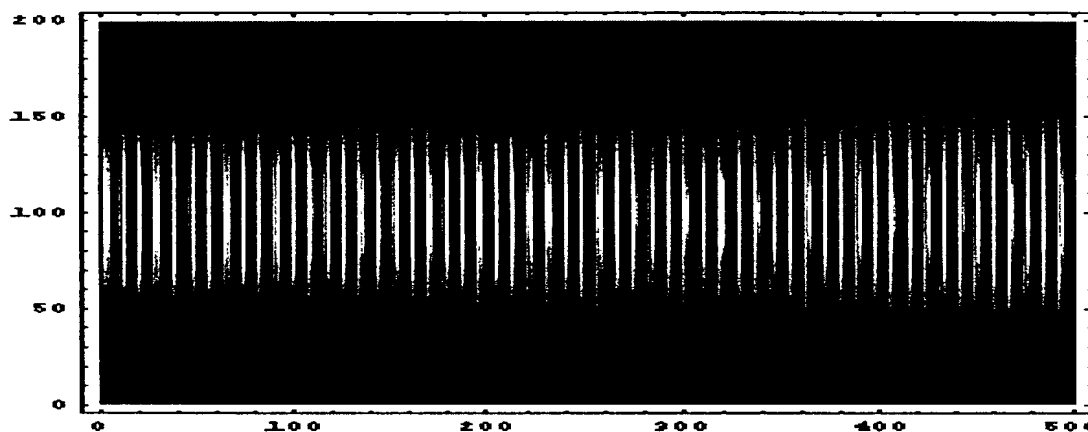
FIG. 24F



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side view



top view

FIG 26

FIG 27A

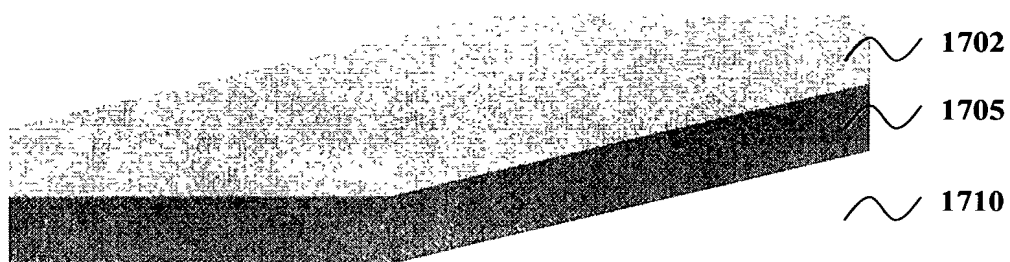


FIG 27B

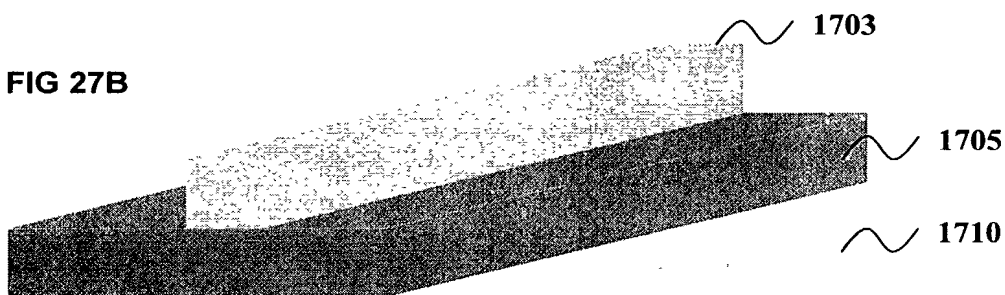
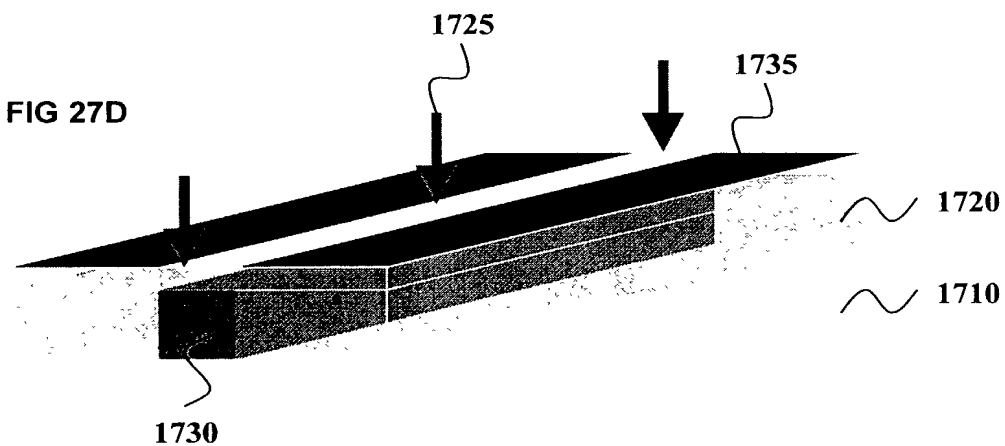


FIG 27C



FIG 27D



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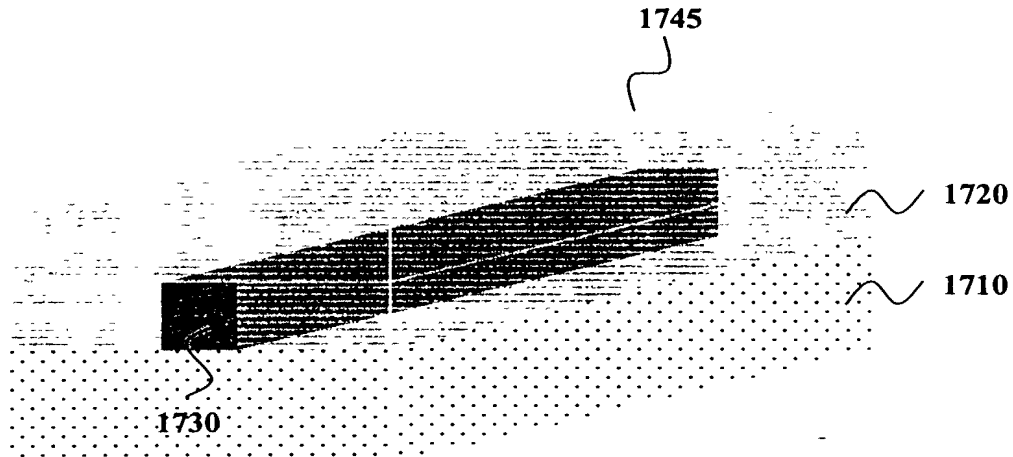
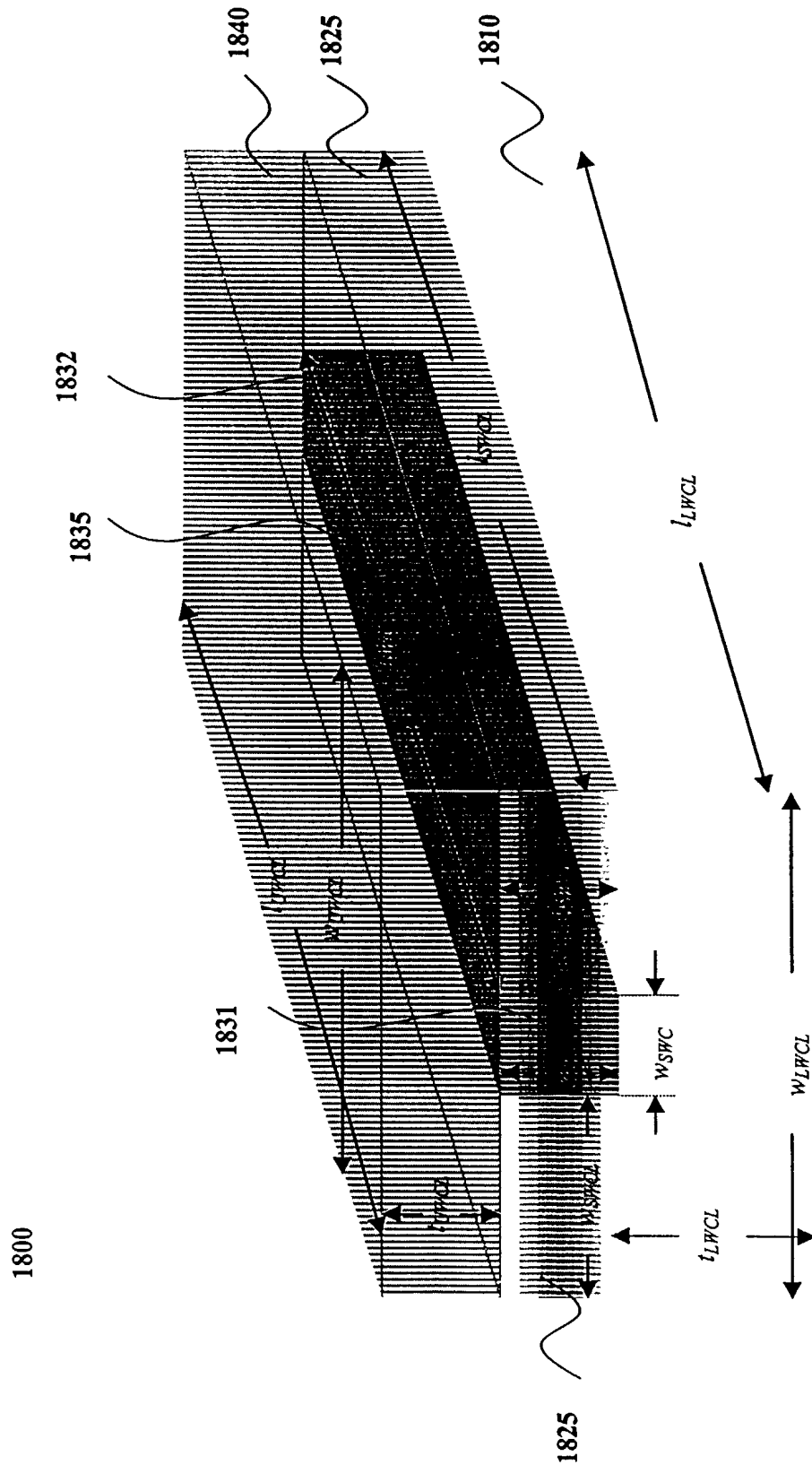
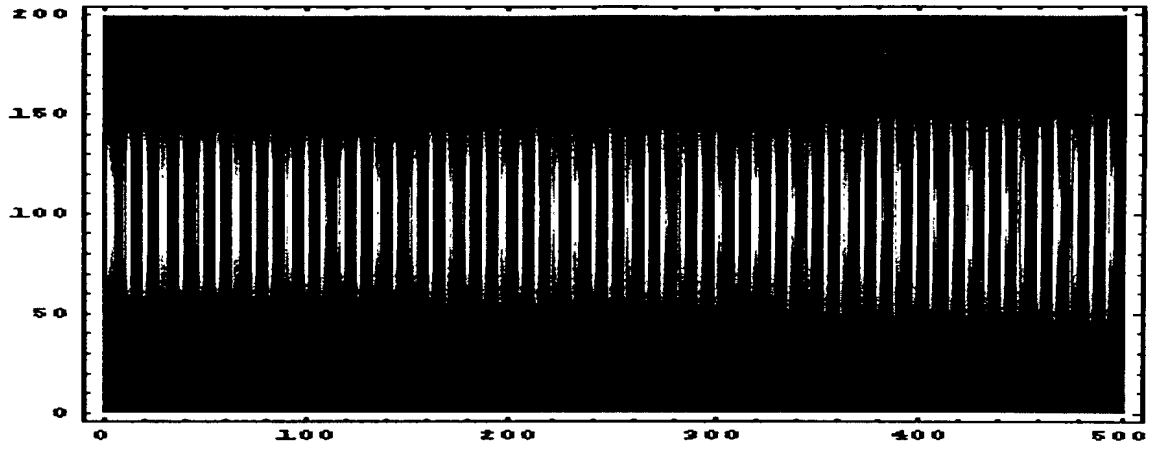


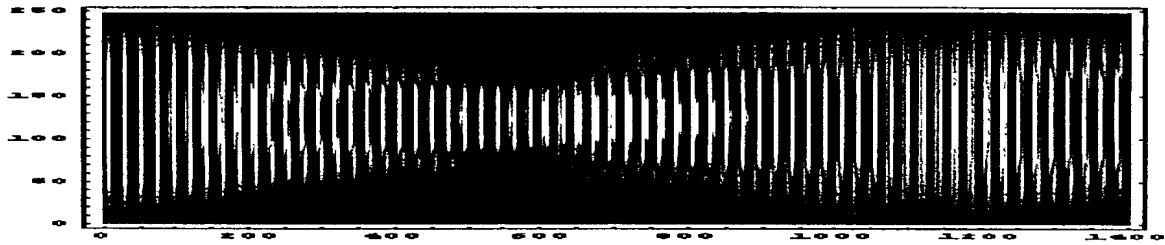
FIG. 27E







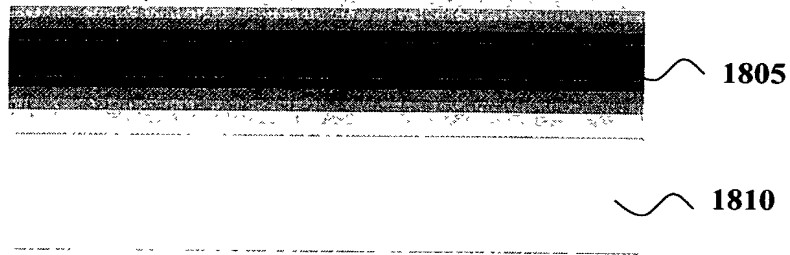
top view



side view

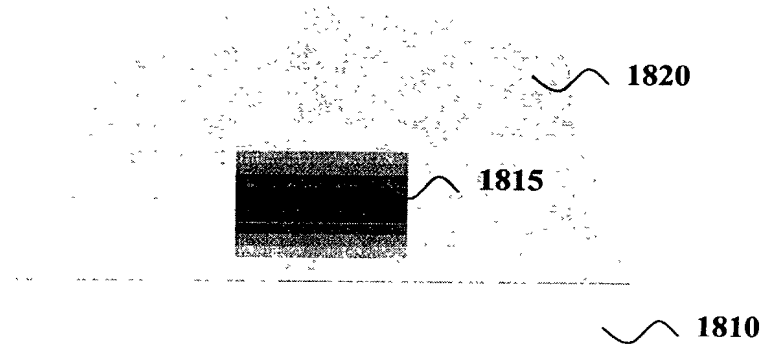
Fig 29

FIG 30A



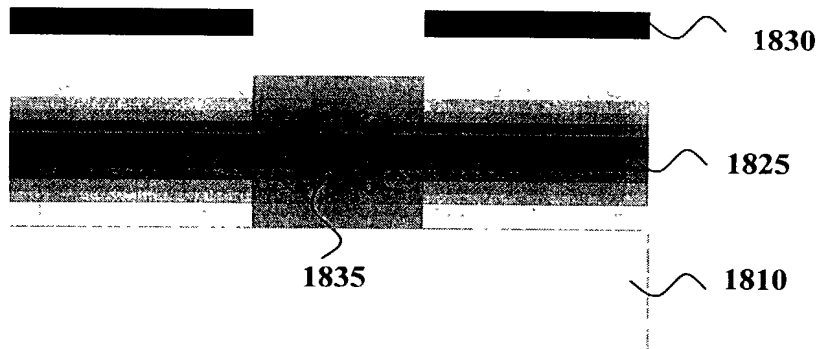
Cross sectional view

FIG 30B



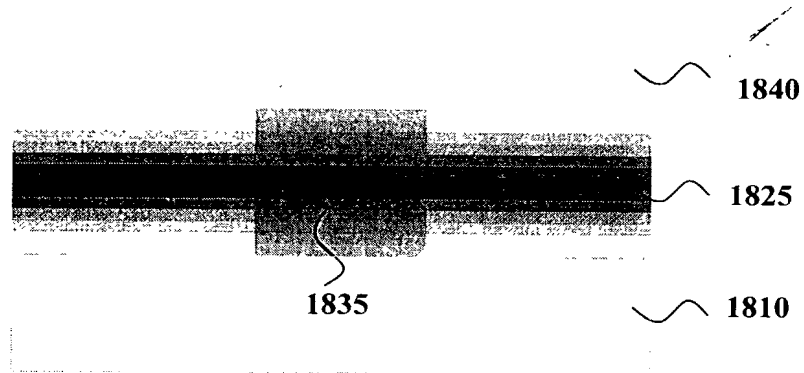
Cross sectional view

FIG 30C



Cross sectional view

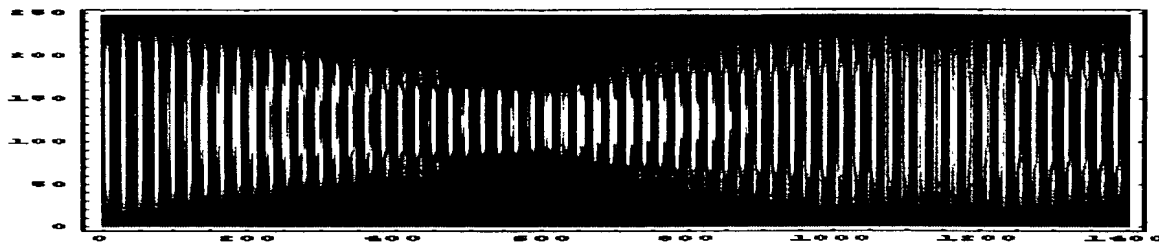
FIG 30D



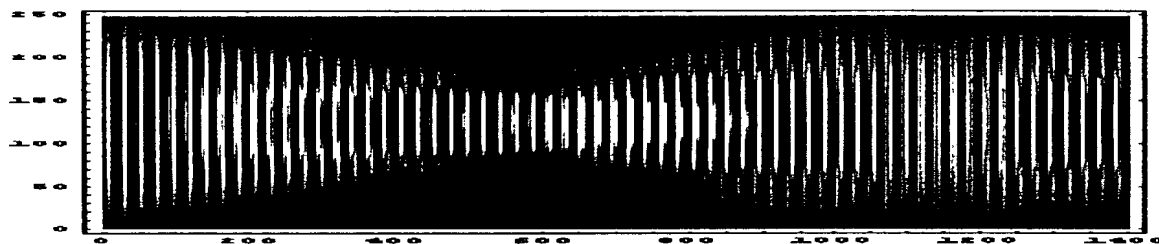
Cross sectional view



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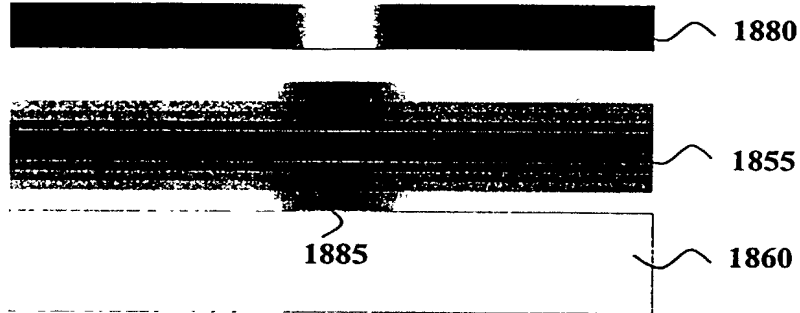
top view



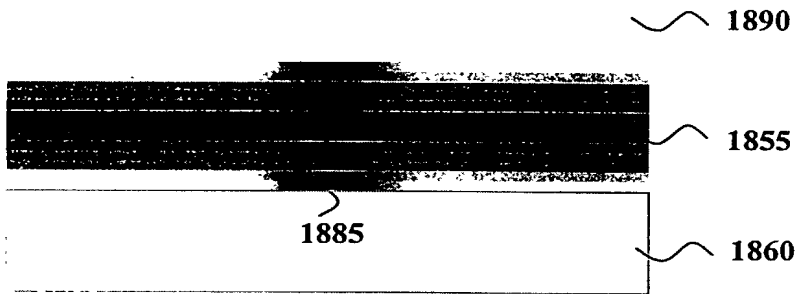
side view

Fig 32

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Cross sectional view  
 FIG 33A



Cross sectional view

FIG. 33B

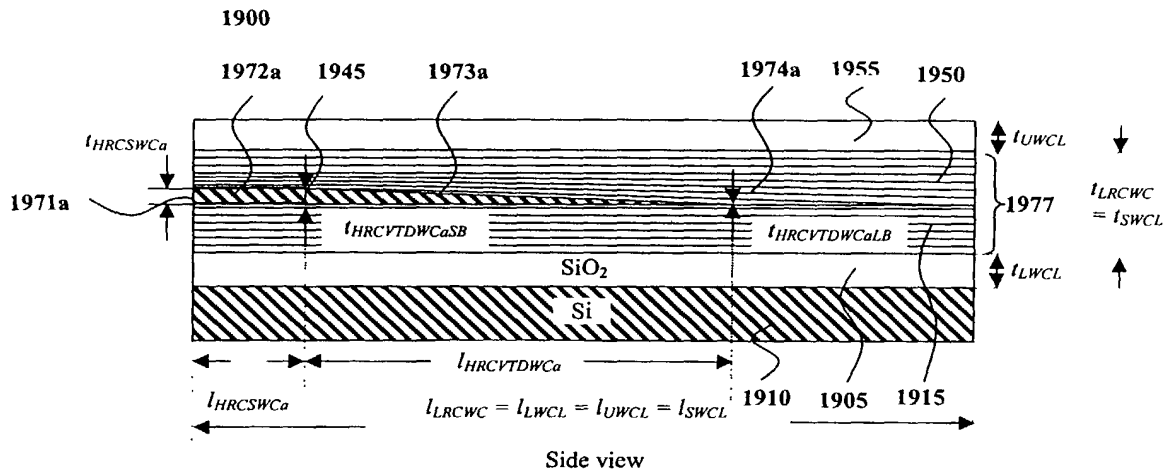


FIG 34A

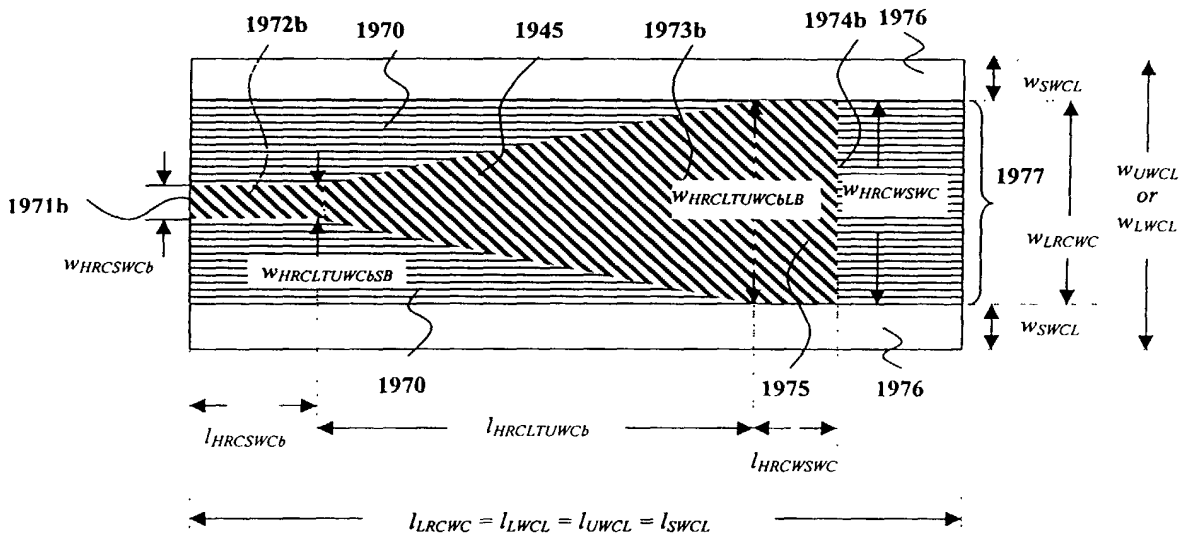
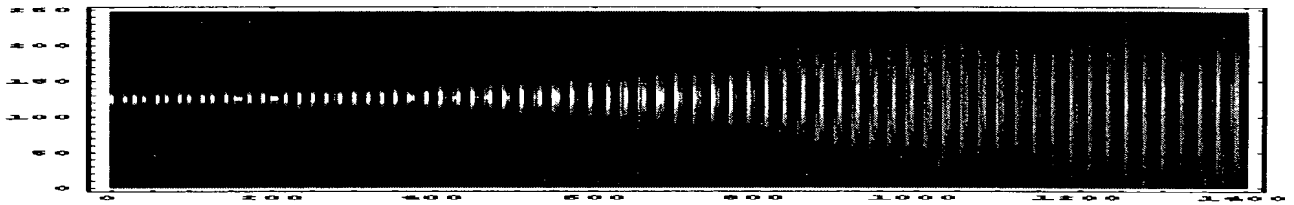
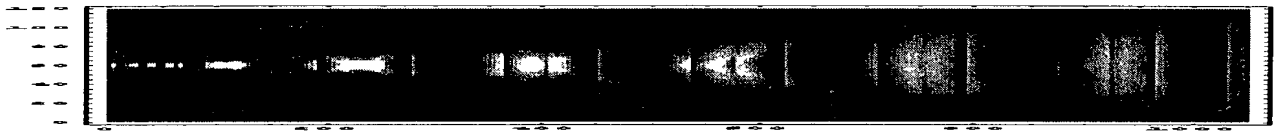


FIG 34B



Side view



Top view

FIG 35



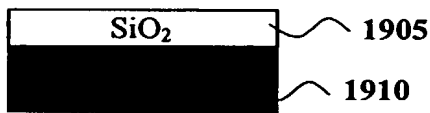


FIG 36A

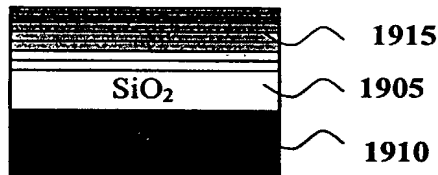


FIG 36B

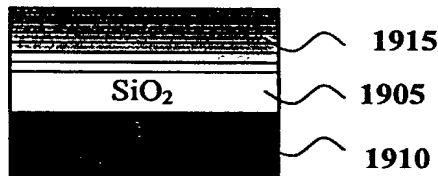


FIG 36C

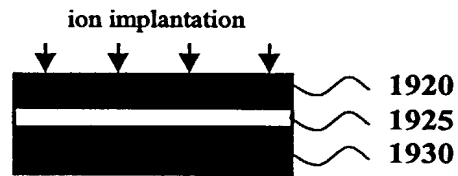


FIG 36D

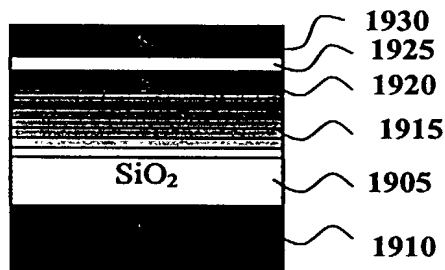


FIG 36E

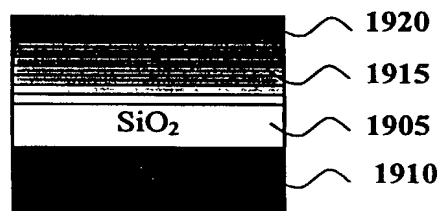
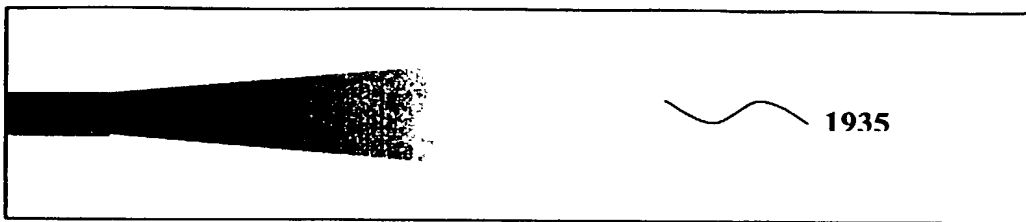
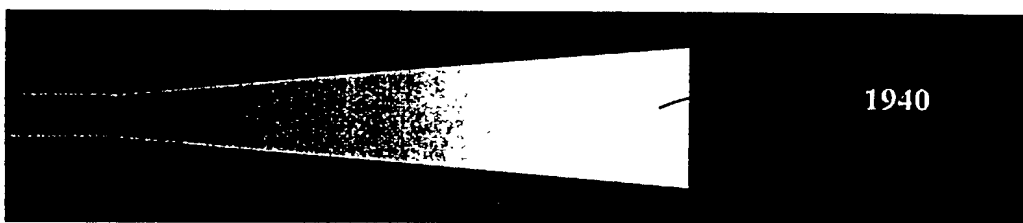


FIG 36F

0093674, 052402

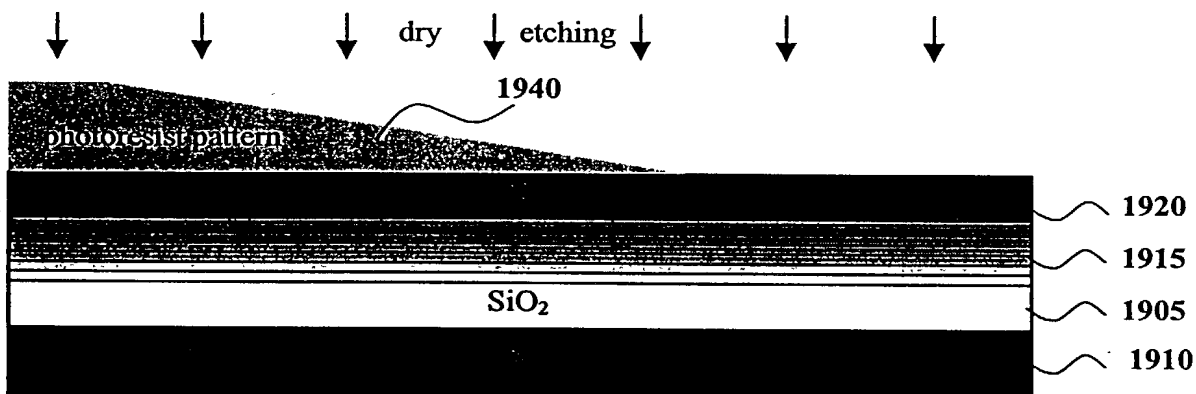


Mask top view  
**FIG 36G**

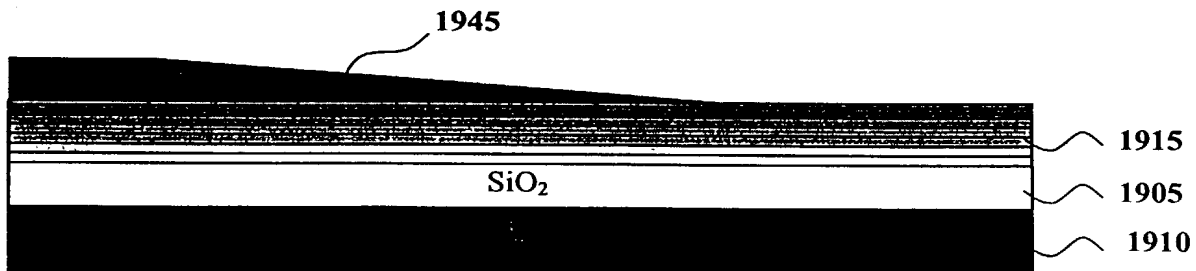


photoresist pattern top view

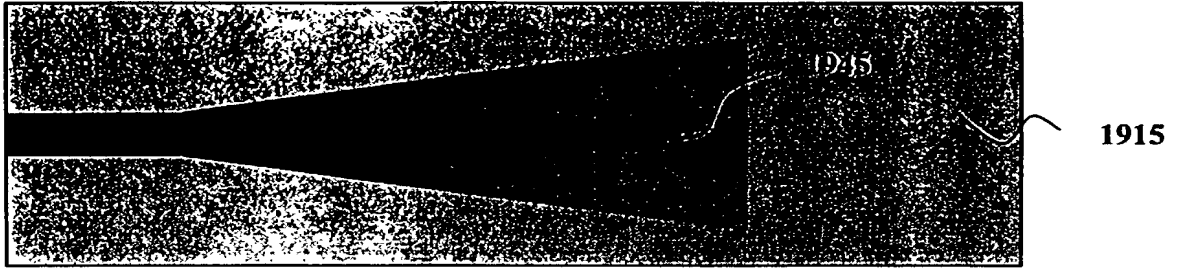
**FIG 36H**



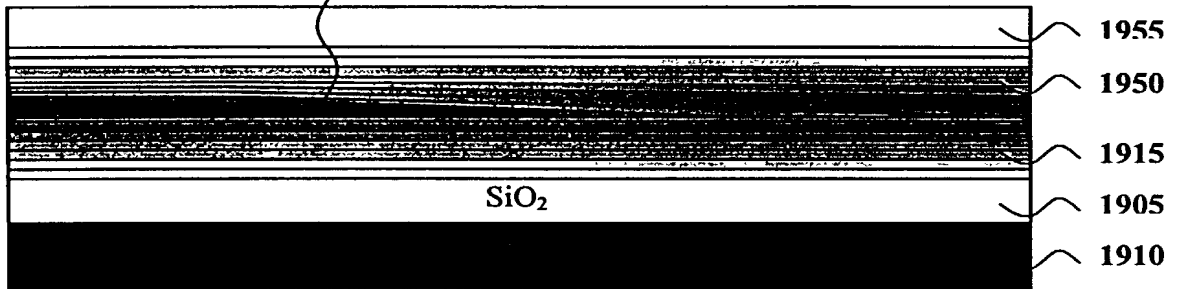
Side view  
**FIG 36I**



Side view  
**FIG 36J**



Top view  
1945  
**FIG 36K**

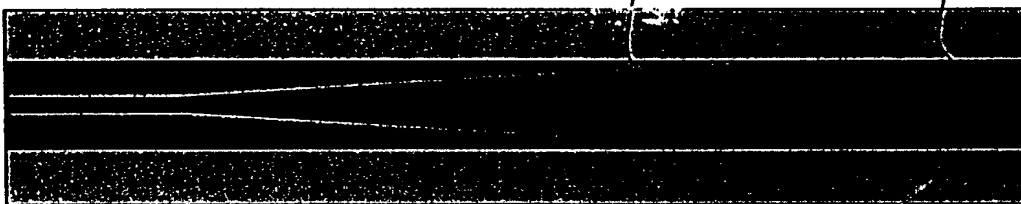


Side view  
**FIG 36L**



mask

**FIG 36M**



Top view  
**FIG. 36N**



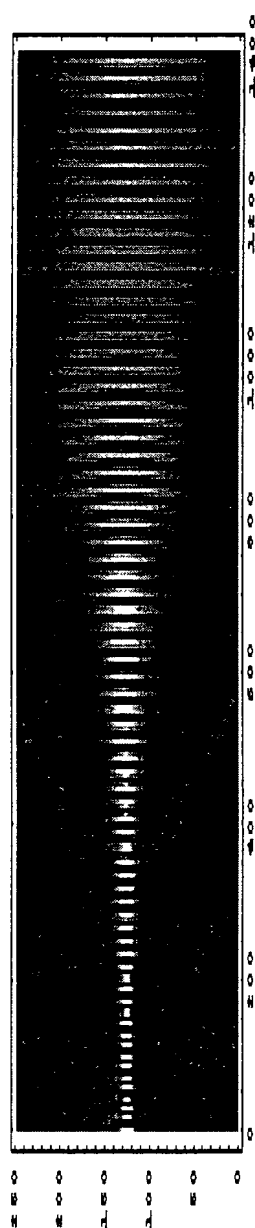


FIG 38

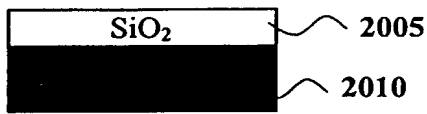


FIG 39A

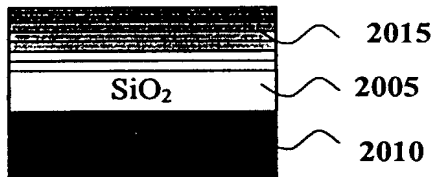


FIG 39B

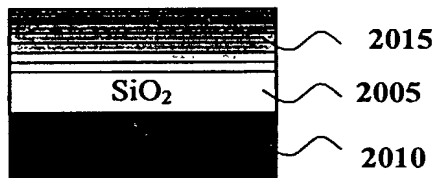


FIG 39C

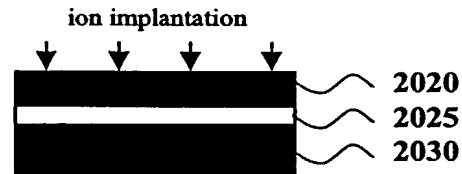


FIG 39D

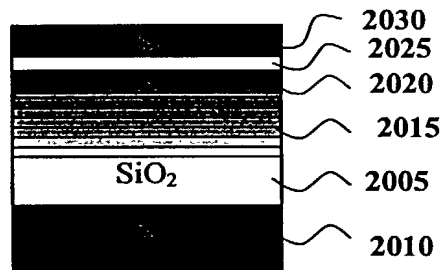


FIG 39E

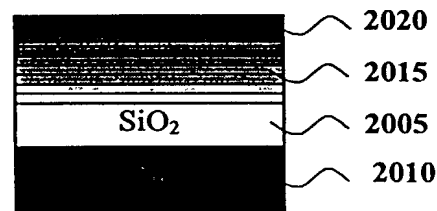
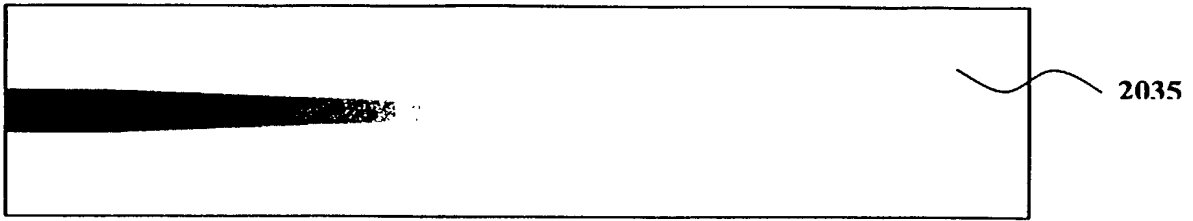
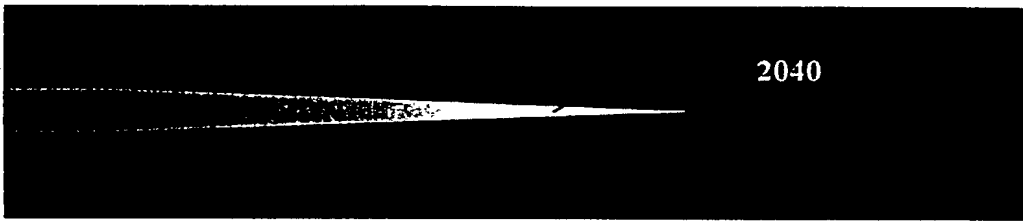


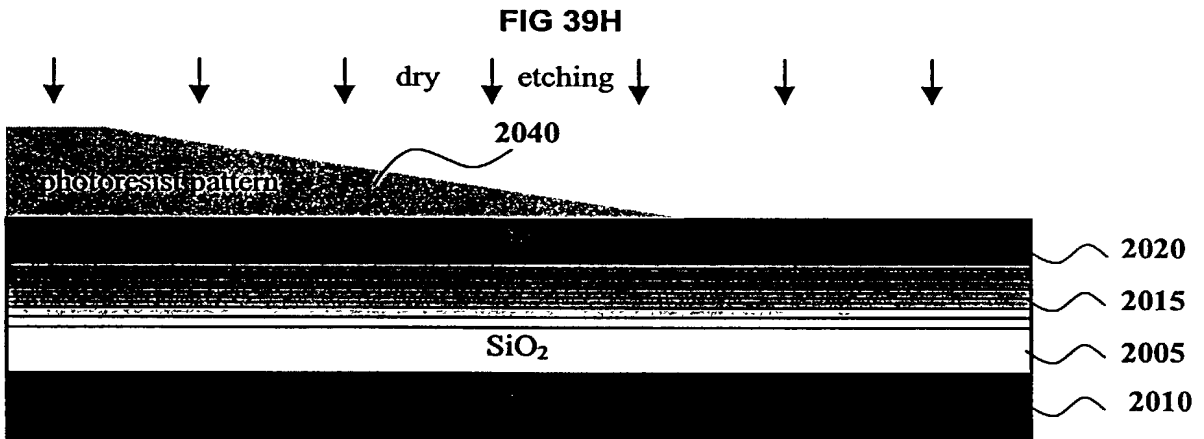
FIG 39F



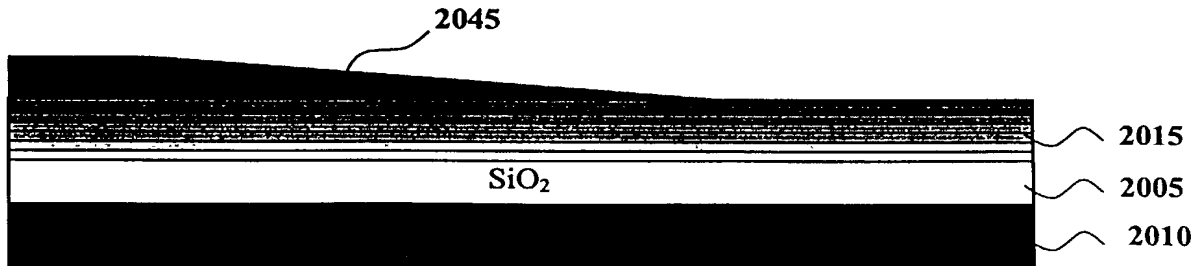
Mask top view  
FIG 39G



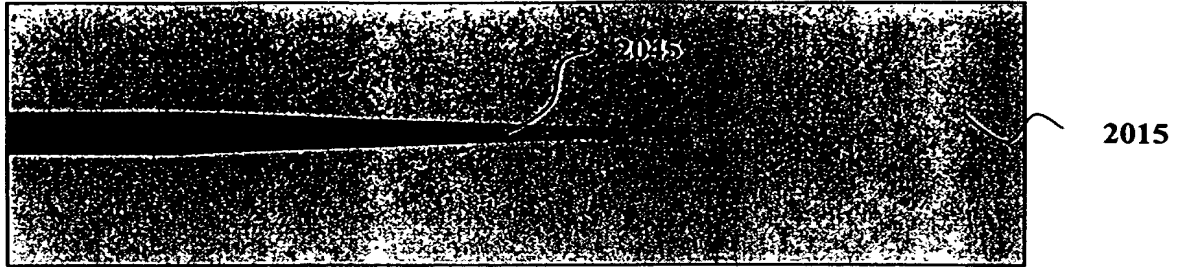
photoresist pattern top view



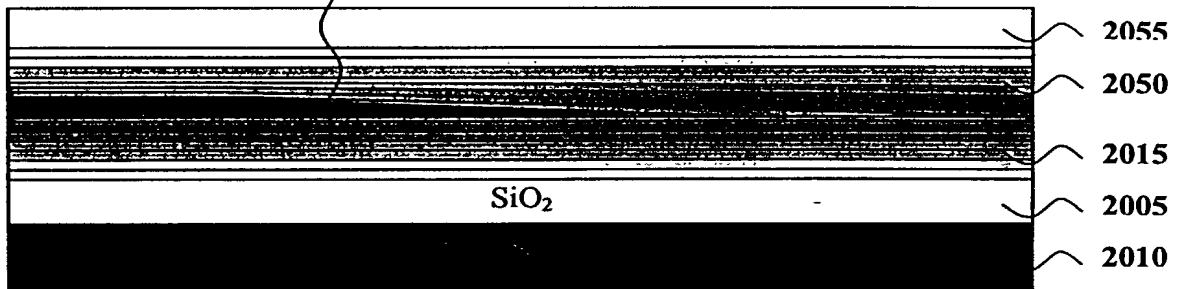
Side view  
FIG 39I



Side view  
FIG 39J



Top view  
 FIG 39K



Side view  
 FIG 39L

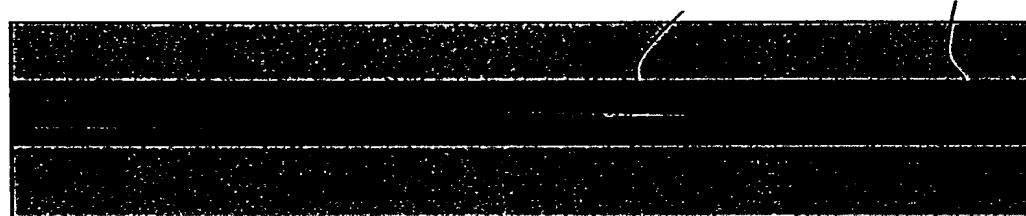


mask

FIG 39M

2045

2065



Top view  
 FIG. 39N



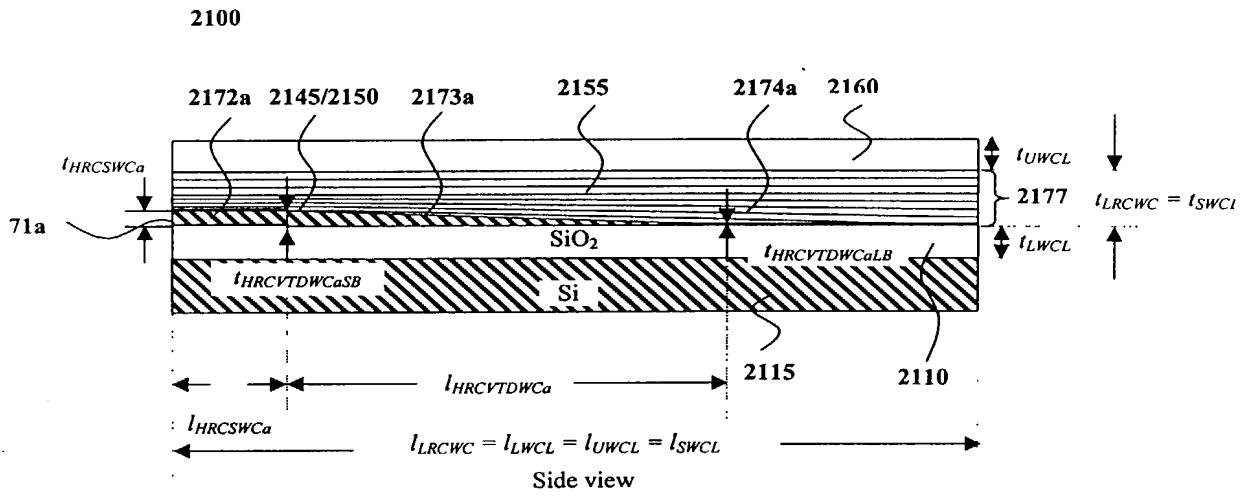


FIG 40A

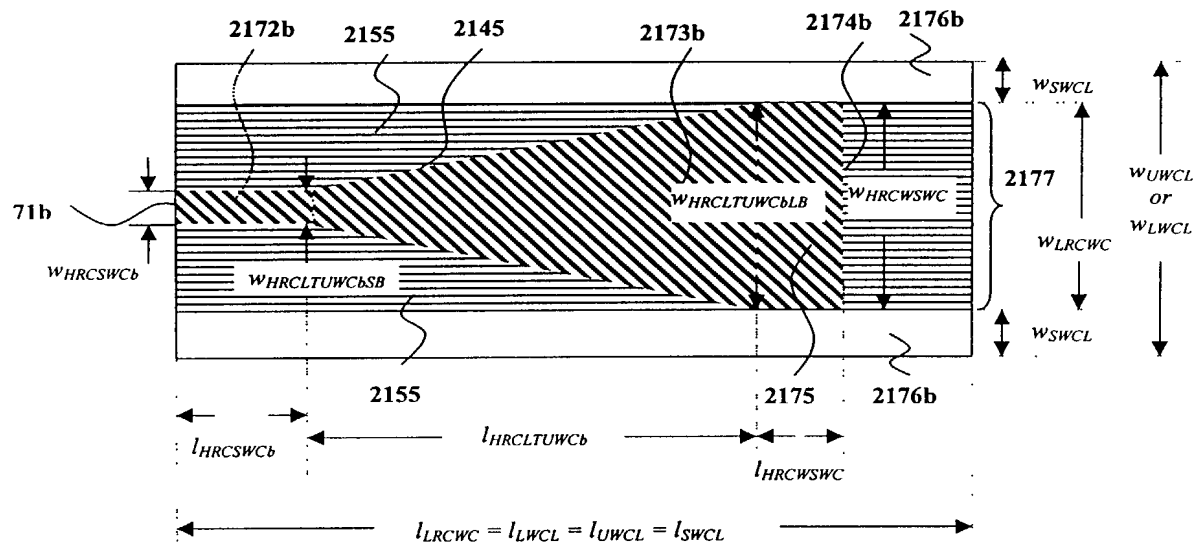
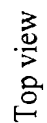
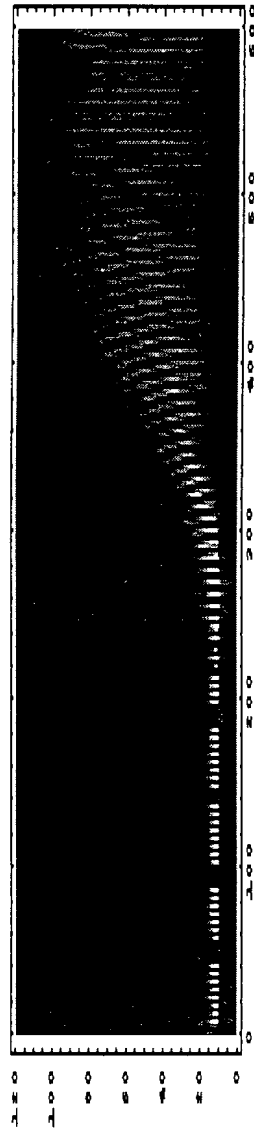


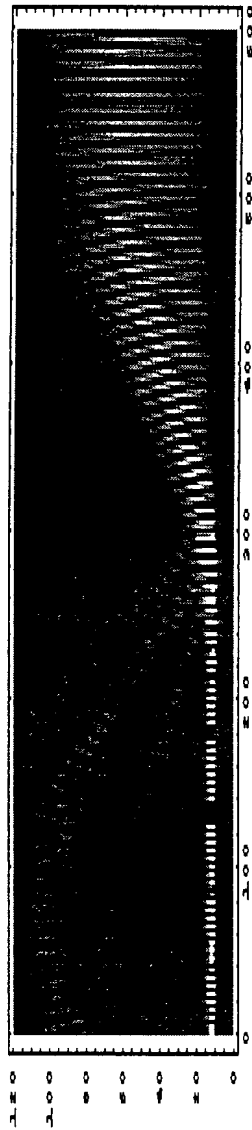
FIG 40B



**FIG 40C**



Taper side launching



GRIN guide side launching

FIG 41

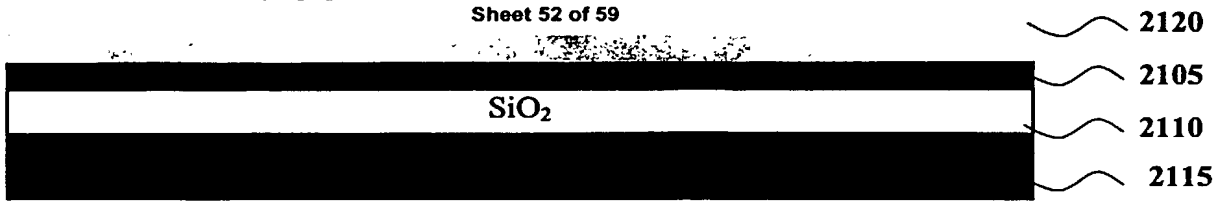
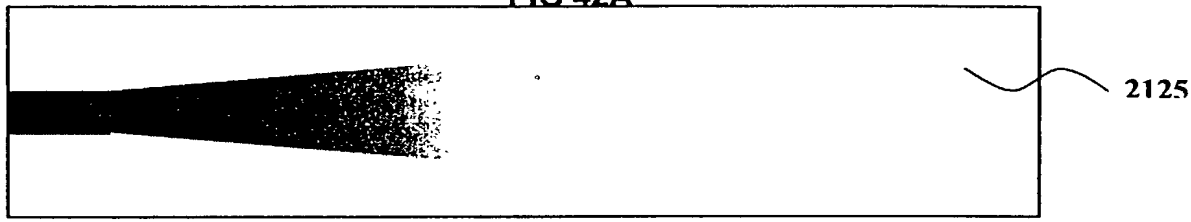
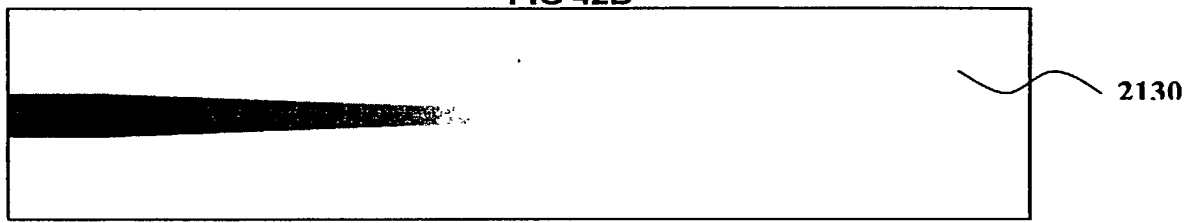


FIG 42A



Mask top view

FIG 42B



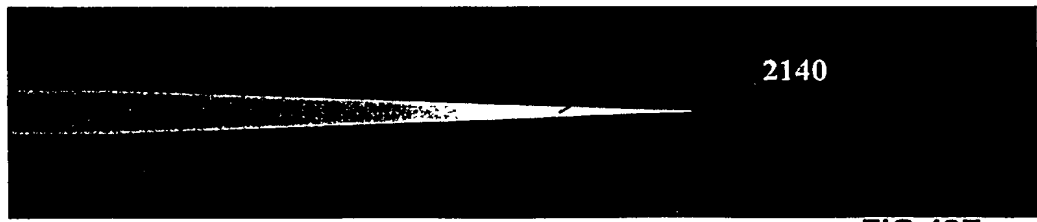
Mask top view

FIG 42C



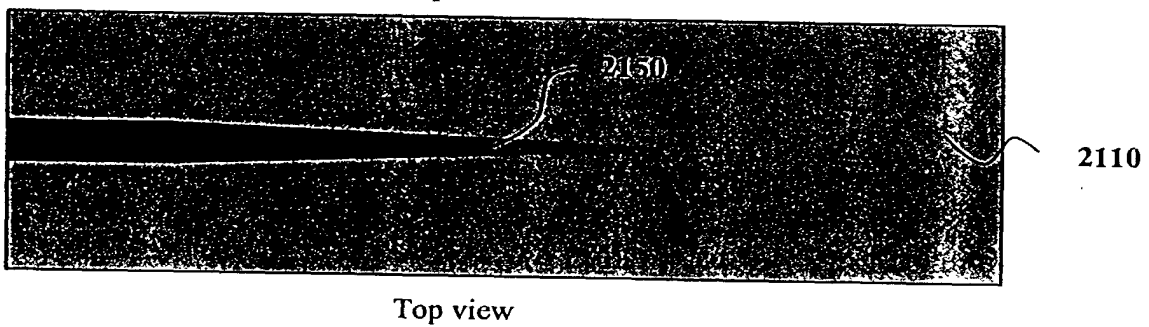
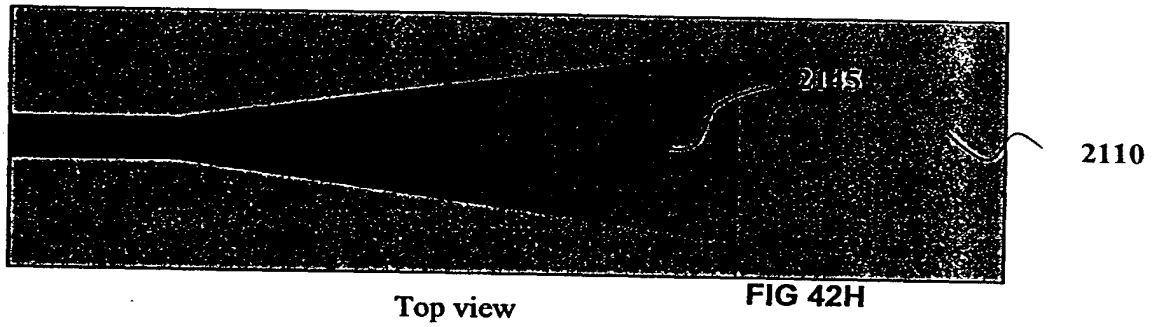
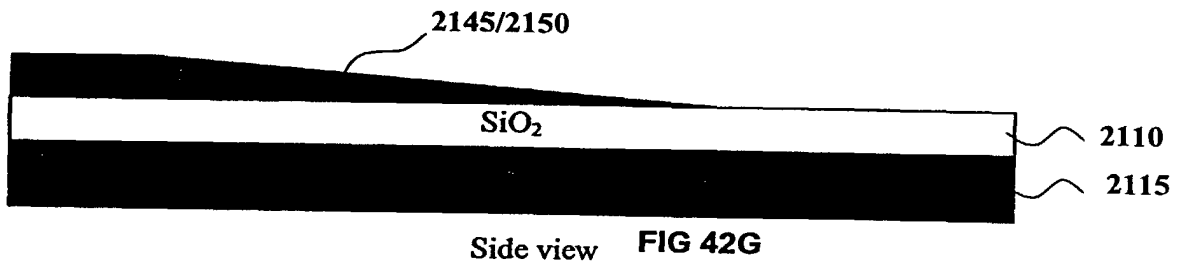
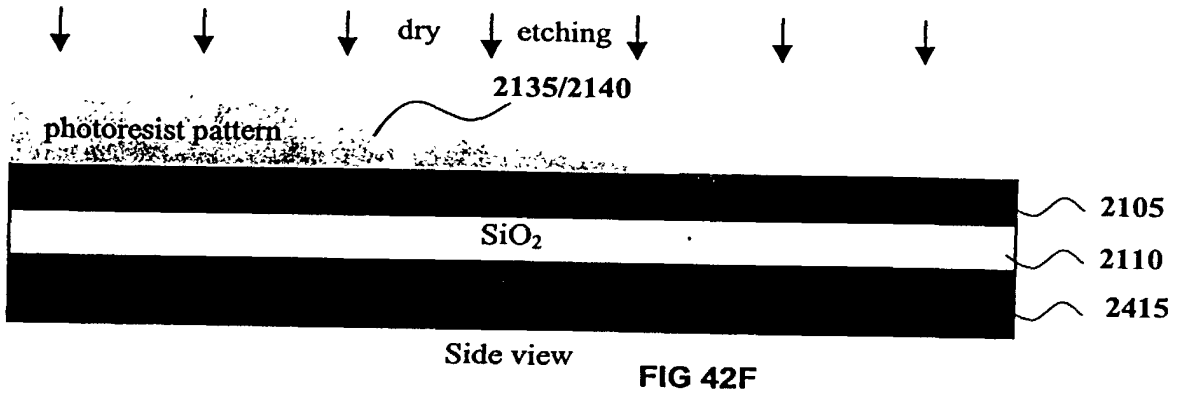
photoresist pattern top view

FIG 42D

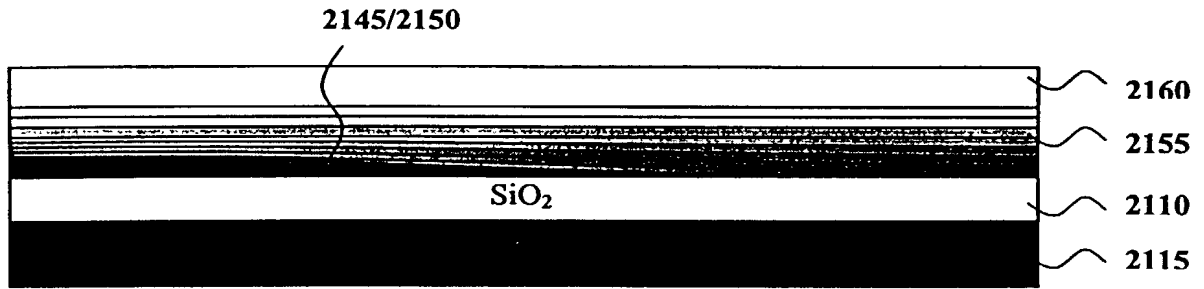


photoresist pattern top view

FIG 42E



Atty. Docket No.: 021040-000300  
 Applicant: Yan Zhou and Seng-Tiong Ho  
 Title: INTEGRATED PLANAR COMPOSITE COUPLING STRUCTURES  
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Side view

FIG 42J



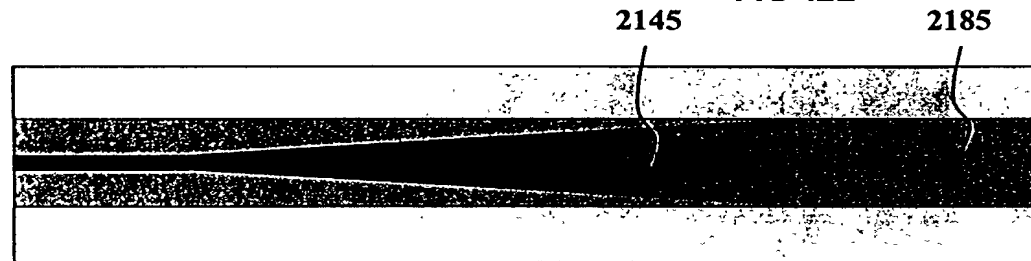
mask

FIG 42K



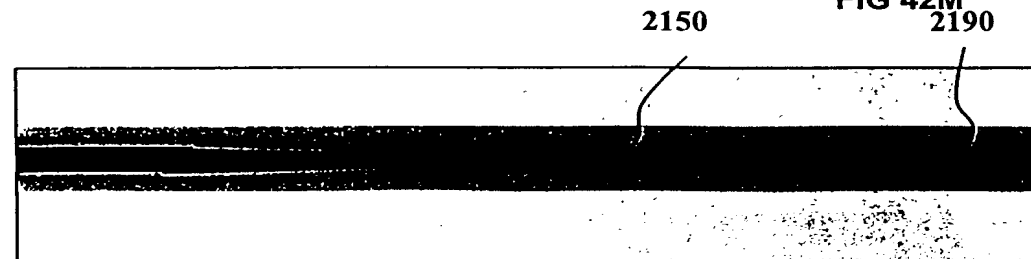
mask

FIG 42L



Top view

FIG 42M



2150

2190

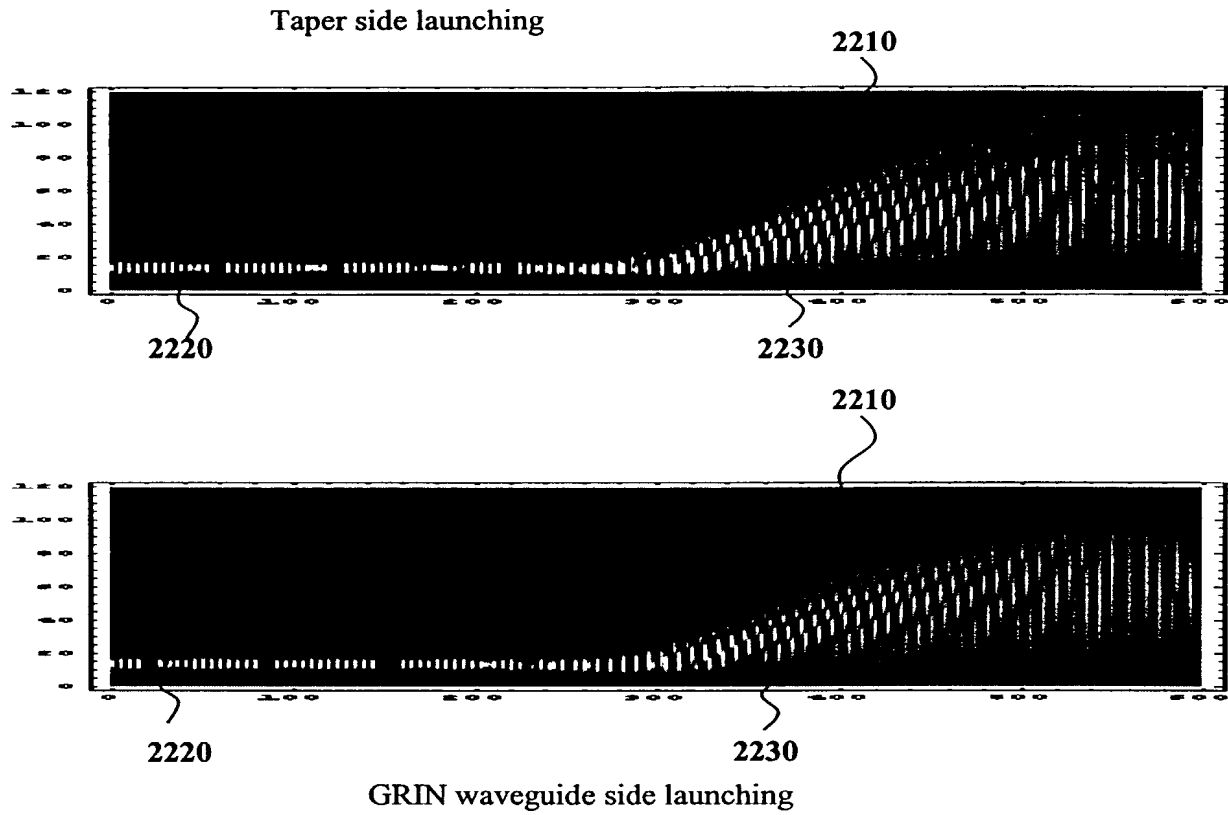


Fig 43



FIG 44A

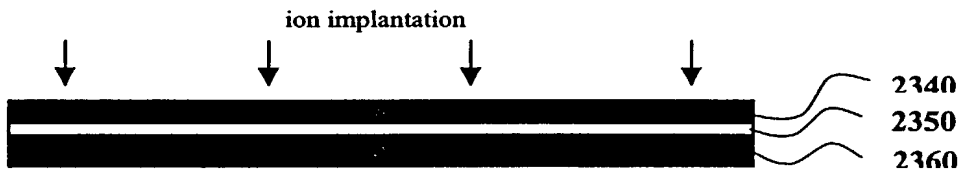


FIG 44B



FIG 44C



Fig 45A

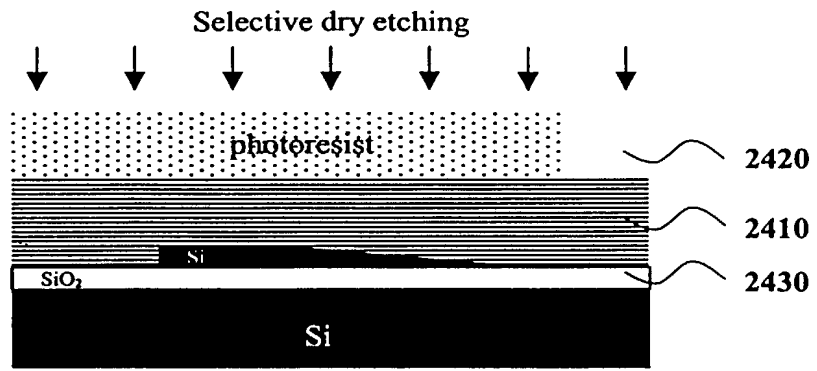


Fig 45B

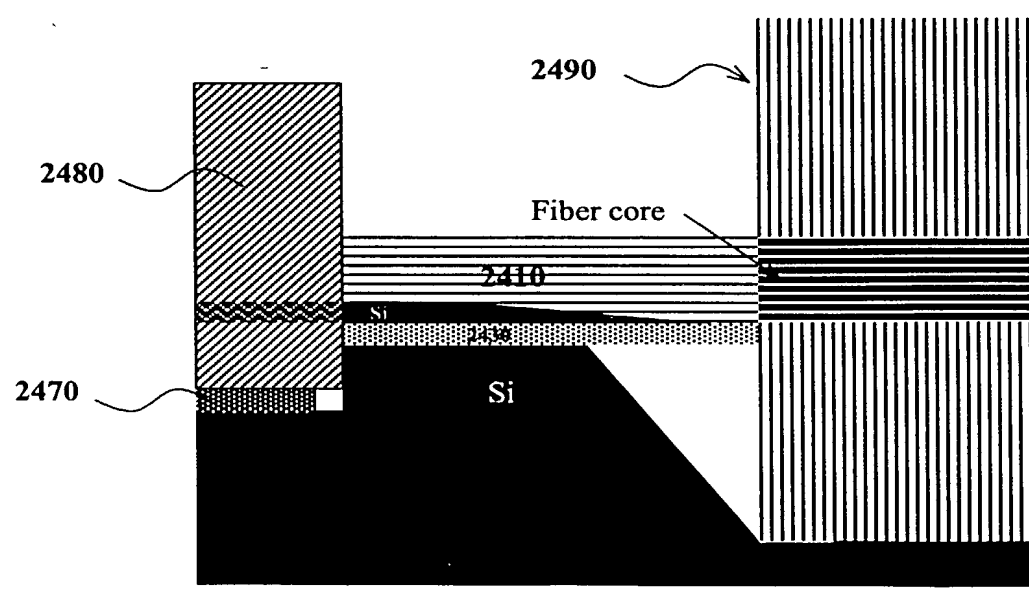
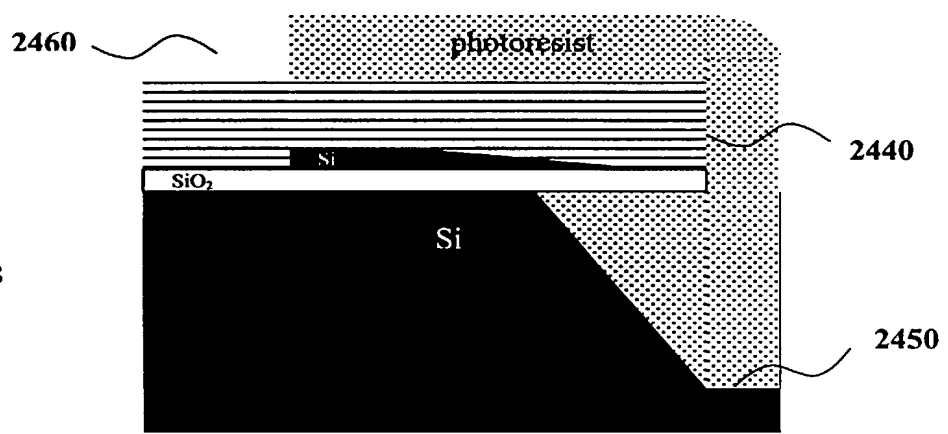


Fig 45C

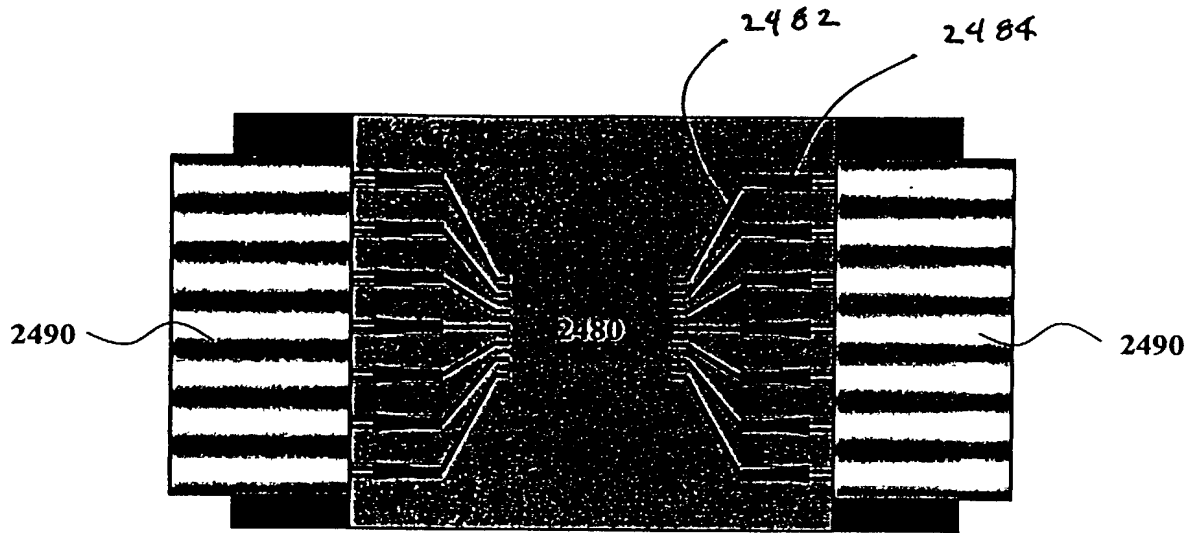


FIG 46

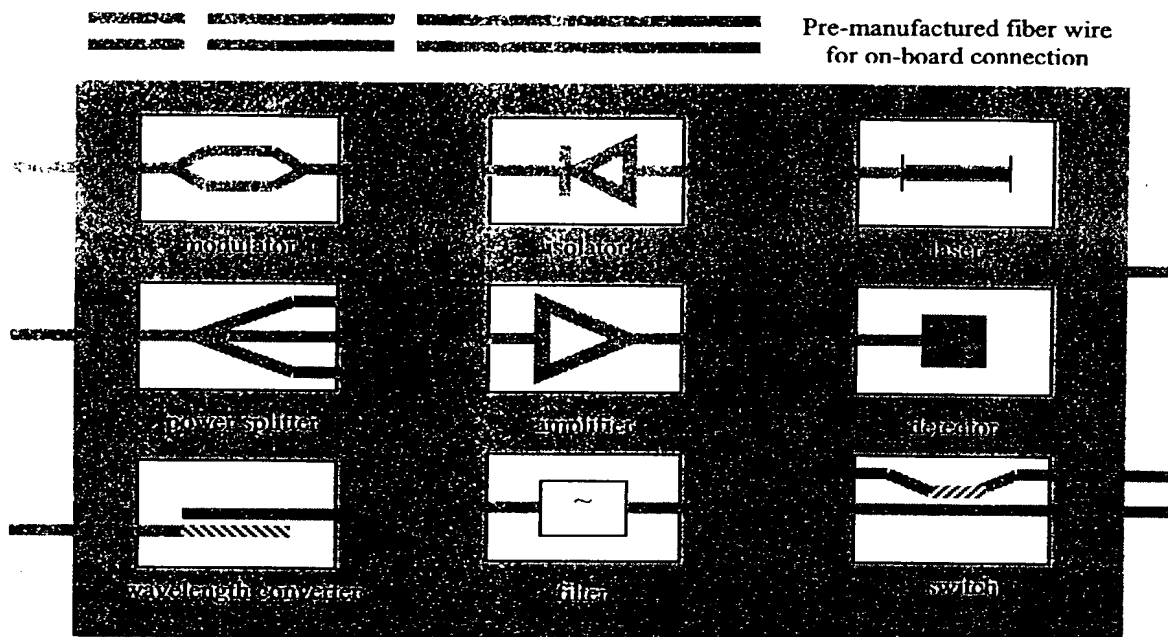


FIG 47